RAILROAD GAZETTE

FRIDAY, MAY 12, 1899.

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Contributions.

Editorial Rules of the Am. Soc. C. E.

New York, April 25.

To the Editor of the Railroad Gazette:

The rules governing publications by the American Society of Civil Engineers seems to me to err in being far too voluminous. Some rules must be made, of course, but Americans do not like to see too much of the machinery of government, and that government is best which governs, or seems to govern, least. I think much of the trouble with these rules of publication comes from aping too closely the standards set, but not always followed, by the Institution of Civil Engineers.

You have put it well and truly as to the use of the third person. This form takes out much of the life and vigor of composition, and makes it appear stilted or over-edited.

I never could see why the "correspondence" was not a part of the "discussion" of a paper, though seemingly it is not. An absurd example of the misuse of "correspondence" occurs to me. A member of the Society, perhaps too modest to speak extemporaneously, wrote out his discussion of a paper, read it at the meeting at which the paper under discussion was read, and handed it in that evening. It appeared as "correspondence," apparently, to my mind, without rhyme or reason.

MEM. AM. SOC. C. E.

Increasing the Height of Standpipes.

Batavia, Ill., April 4, 1899.

To the Editor of the Railroad Gazette:

I note with interest your article in the issue of March 31, on the method of increasing the height of standpipes. While I do not desire to enter into a controversy as to the most economical manner of accomplishing this result, I cannot agree that the double elbow inserted in the spout would make nearly as efficient a crane for quick water service as the straight spout.

Simultaneously with the higher tenders has come the demand on the part of railroads for quicker service.

The larger tanks must be supplied at the loss of as little additional time as possible. By introducing into the spout a double elbow there is a certain amount of head lost when delivering the water to the tender, due to the increased friction in the reversed elbow. There would then be four 90 degree turns between the top of the vertical pipe and the outlet. As every bend or elbow has the tendency to lessen the effective pressure by increasing the friction to be overcome, they should be avoided as much as possible in the crane, as well as in the supply pipes.

It has been the custom on several roads to raise the spouts by inserting between the upper and lower sections of the vertical pipe a short piece of flanged cast pipe. Into this extension, there is sometimes cut around the pipe a shallow groove or notch, thus slightly weakening the pipe at this point so that in case of accident, the break will occur in this short and comparatively inexpensive piece, and thereby lessen the liability of damage to the heavier and more costly parts. The extension made in this manner is termed the breaking joint.

The work of putting in this flanged piece of pipe and the longer valve rods is simple and takes but a short time.

Our shop experience has been that this method is cheaper than making the expensive and ungainly looking double elbow, and will save anywhere from two to five dollars, according to the size. Such an arrangement also obviates the necessity of any change in either the horizontal rods or angle lever at the top, which would otherwise certainly be required on most cranes if the spout were elevated more than a few inches.

An extension nozzle then permits the crane to accommodate either the lower tenders of the switch engines or the high modern locomotives.

L. E. WOLCOTT.

The Y. M. C. A. on the Atchison.

Omaha, Neb., May 5, 1899.

To the Editor of the Railroad Gazette:

In reply to your inquiry about the establishment of reading rooms on the line of the Atchison, Topeka & Santa Fe, I can say that three new buildings will soon be finished and in use at three important places on the line of the Atchison system.

At Argentine is the largest freight terminal on the road, about 1,000 men centering there. Some years ago a reading room was opened at this point by the railroad company, but failing in its object, it was closed. Our $10,000 building is practically completed and will be opened to the men in about ten days.

At Cleburne, Tex., are located the largest shops and most important division point on the Gulf Colorado & Santa Fe. Here the contract is let for an association building to cost, furnished, about $11,500.

At Temple, another large division point on the Gulf Colorado & Santa Fe, our building will be completed this month and will cost, equipped, over $12,000.

At Topeka are located the operating headquarters of the A. T. & S. F. Ry. and the largest shops on the system. The railroad Y. M. C. A. here has been in existence nearly 14 years and at present has a membership of about 650.

It is true, as stated in the Missouri newspaper from which you quote, that clubs for railroad men managed by organizations other than the Young Men's Christian Association have in many cases been unsuccessful. Many railroad officers can testify to this. The statement applies to reading rooms, clubs, boarding houses, bunk houses and similar establishments, whether conducted by railroad companies or by the men themselves. There is lacking in them the element of organization and, above all, that spirit of co-operation and helpfulness that is only known to those who are willing to serve men for Christ's sake; this is the leaven that has made the Young Men's Christian Association the mighty power that it is to-day.

The President of the Atchison, Topeka & Santa Fe, in a letter published in the Topeka Journal not long ago, explicitly stated that under certain conditions the Y. M. C. A. was better able to manage these rooms and conduct them in an attractive manner than the company was. The company has largely assisted the Y. M. C. A. at Topeka for many years, paying the salary of the Secretary, furnishing the building free and paying other expenses. At the places mentioned above, where new buildings are now finished or begun, the railroad company furnishes the ground and not only pays the salaries of the secretaries, but contributes a large share of the money for the buildings.

GEORGE D. McDILL.

Cast Iron or Steel Tired Wheels.

New York Car Wheel Works,
Buffalo, N. Y., May 3, 1899.

To the Editor of the Railroad Gazette:

Referring to the editorial in your issue of April 7 on the comparative merits of cast iron and steel tired wheels and the letter of the Standard Steel Works, published in your issue of April 29, we fully agree with the latter company that a discussion of this important subject should be based on facts rather than on opinions. As to their statement that no one would contend that a chilled wheel is as strong as one of the best makes of steel tired wheels, we beg to differ from the same. No doubt chilled wheels made with sole reference to cost are inferior to the best makes of steel wheels, but that does not prove that the best make of chilled wheels is not as strong as the best make of steel wheels.

The increasing conditions of service in respect to loads carried, speed of trains and the consequent increase in the strain on wheels due to brake service, have materially altered the conditions of wheel service and we believe that quite a number of railroad officials are of the opinion that a solid wheel of superior quality is fully equal to any built-up wheel in which entire dependence must be placed upon bolts, retaining rings, etc.

We have in the past five years given much attention to the production of a superior grade of chilled wheels for the reason that a number of the leading railroad companies have desired to obtain such wheels; whether this is or is not due to the failure of steel wheels to meet the demands of service, we cannot say, but the fact remains that we have been and are producing such special chilled wheels in large numbers. They have been submitted to all the tests required in foreign countries to demonstrate the value of steel wheels and have not only met, but have exceeded the same. The results in service are equally satisfactory.

In America, steel wheels are put in service without any test for quality before acceptance from the manufacturer, but during recent years, the tests applied to chilled wheels have constantly increased in severity. The Thermal Test, applied by the Pennsylvania and other railroad companies, demands a production of cast wheels that will successfully resist an expansion of from three-eighths to one-half inch in diameter; whether steel wheels would pass such a test without serious damage to bolts, retaining rings, etc., is a question.

It cannot be denied that if tests of this character are requisite to establish the quality of chilled wheels, they are equally necessary for the same purpose with steel wheels.

It is not necessary at this stage of the question to go into details of the results of service obtained from special chilled wheels during the past four or five years under the heaviest locomotives and passenger cars, but when the time for the presentation of facts arrives, we shall be very glad to give them.

P. H. GRIFFIN,
President.

The Manufacture of Car Wheels.*

Fifteen years ago it was customary to purchase and supply wheels to railroads on a mileage guarantee, the only restrictions as to quality being the depth of chill and the size, shape and weight of the wheel. Now all this is changed; the progressive wheel-maker buys his irons on specifications, and checks them by chemical analysis, and every heat is tested physically and chemically. Records are kept of the strength and resilience of the various irons on the market, and of the manner in which his wheels fail. The actual shape of the wheel has undergone little change from the original Washburn section, except in the matter of size and weight, but we have every reason to believe that the older wheels cannot be compared with modern wheels in strength or endurance.

About the time when the drop test was first introduced, the writer was Assistant Superintendent of a railroad shop which contained a foundry making 100 wheels per day. The introduction of this test, and the failure of a number of wheels in service about that time, caused him to make efforts to secure a stronger casting. Each day test bars were made along with the wheels, and these were subjected to transverse test, and a graphical record kept, as shown by Fig. 1. The bars for this purpose were 2 in. square by 24 in. long, and were placed on supports 21½ in. apart, and a centre load applied. As one-half the bars were chilled, it was considered that a 2 in. bar was a proper size to illustrate the chilling qualities, without becoming white through and through, and the span was fixed at 21½ in., so that when the proper deductions were made for the span and modulus of section, the corresponding direct stress was exactly four times the centre load, thus facilitating the preparation of the form for recording the tests.

The bars of wheel iron so tested should stand a centre load of from 12,000 to 14,000 lbs. before breaking, this corresponding to a maximum fibre strain of 48,000 to 56,000 lbs. per square inch. The deflection at the moment of breaking is also of great importance, and there are wide differences between various irons in this respect. While the strength of the metal indicates a power to stand pressure, we need the resilience to withstand shocks. A ready means of comparing the relative resilience of different irons is derived from the curve shown in Fig. 1. As the ordinates represent loads and the abscissæ deflections, the area bounded by the axis of abscissas, the ordinate passing through the final point of the curve (i. e., the ordinate corresponding to the final deflection), and the curve itself will represent the work done or absorbed by the test bar up to the breaking point; and for quick comparisons the small rectangles into which the sheet is divided may be counted within the boundaries above mentioned. Good wheel iron will give curves with an included area of from 150 to 200 of the small rectangles, and a total deflection of 0.2 in. at centre. Of course these comparisons can only be made with bars of the same size and under the same conditions. This same treatment has been accorded to unmixed pig iron. The amount of chill and shrinkage are also noted, together with the color of fracture and the chemical analysis of the iron.

It happened not long ago that a certain iron, which had previously given good results, became almost unfit for use, principally by reason of a great decrease in the amount of manganese. At one time this would probably not have been considered of such vital importance, but the fact has recently been well established that a certain amount of manganese is necessary in order that a wheel shall successfully stand the thermal test; it also seems to increase its strength under the drop test.

What most interest the founder are those which

*Extracts from a paper by G. R. Henderson, presented at the Washington meeting (May, 1899) of the American Society of Mechanical Engineers.

are scrapped for cracked plates, cracked brackets, and broken-to-pieces, as these show improper manufacture in the majority of cases. As the Master Car Builders regular guarantee is for forty-eight months, all wheels which run over five years may be considered as giving good service; and if these wheels can be obtained, the study of their analysis is very beneficial. Therefore, wheels giving a very short service or a very long one should be carefully inspected and analyzed, as they will show the bad and good features in a much more forcible way than drop or thermal tests. Mr. W. W. Davis, chemist of the Norfolk & Western Railway, who with the writer has given much attention to this subject, analyzed a large number of wheels giving a long or short service or tested by the drop or thermal methods, and we present the results of some of his work:

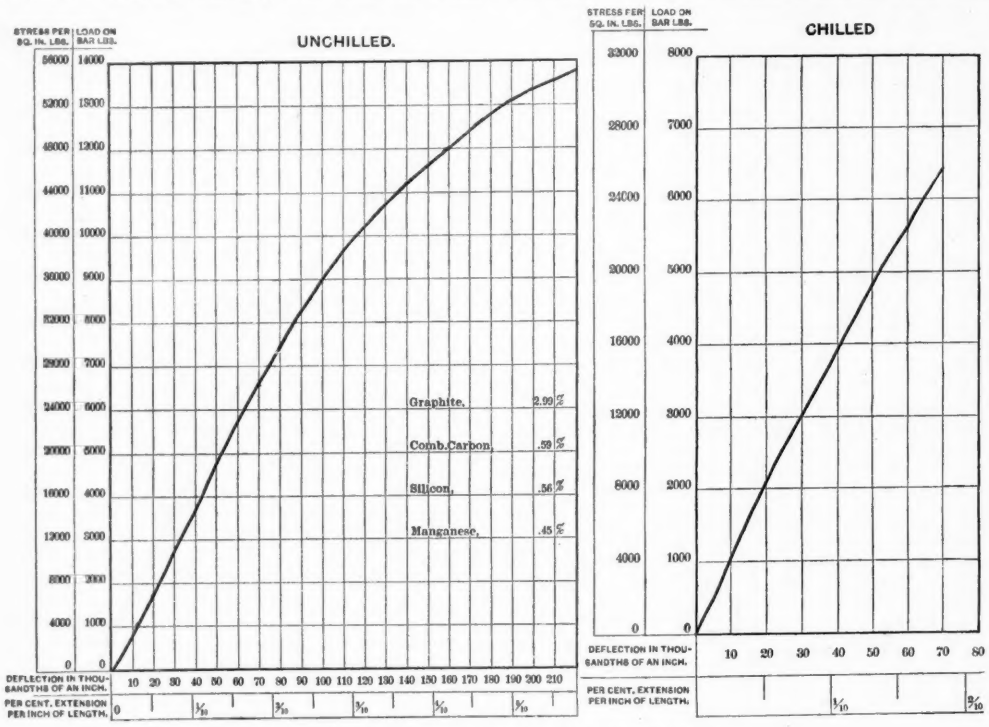


Fig. 1.—Henderson on the Manufacture of Car Wheels.

Analysis of Car Wheels.

	Which stood thermal test for 60 min.		Which stood 40 or more blows drop test.		Which gave 5 or more years of service.	
	Max.	Min.	Max.	Min.	Max.	Min.
Graphite	3.28	2.65	3.31	2.65	3.18	2.23
Combined carbon	.95	.32	.90	.50	1.24	.56
Silicon	.75	.50	.70	.50	.94	.58
Manganese	.53	.20	.46	.24	.34	.13
Sulphur	.088	.055	.086	.040	.085	.047
Phosphorus	.48	.35	.52	.36	.49	.25

It will be seen that these limits are rather wide, but below are given what are considered to be the desirable limits for chemical constituents of wheels:

Desirable Wheel Analysis.

Graphite	2.75	per cent.	to	3.00	per cent.
Combined carbon	.50	"	"	.75	"
Silicon	.50	"	"	.70	"
Manganese	.30	"	"	.50	"
Sulphur	.05	"	"	.07	"
Phosphorus	.35	"	"	.45	"

By comparing the above with the analyses of a large number of wheels it was found that these limits excluded those which broke through rim in ten minutes or less under the thermal test; broke with twenty blows or less under the drop test; or gave less than two years' service. This last is important, as a wheel can easily be made to stand strains, but the wear will be unsatisfactory, and the metal must have enough chill to stand the abrasion of the track. It is possible to obtain a chill three-quarters of an inch deep on the tread with these proportions.

The analyses of seven wheels which had given from eight to eleven years' service each had the following limits:

Graphite	2.56	per cent.	to	3.10	per cent.
Combined carbon	.63	"	"	1.01	"
Silicon	.58	"	"	.68	"
Manganese	.15	"	"	.27	"
Sulphur	.05	"	"	.08	"
Phosphorus	.25	"	"	.45	"

The metal charged into the cupola should contain more graphite, silicon, and manganese and less combined carbon than are desired in the finished product. If the iron in stock is deficient in manganese, the proper amount can easily be added to the mixture in the ladle by the use of ferro-manganese containing about 80 per cent. manganese, 13 per cent. iron, and 6 per cent. carbon (combined). The use of large proportions of scrap makes this particularly useful, and it is of great assistance in enabling the wheel to stand the thermal test and consequently the strains from severe braking when in service.

Indeed, cracked plates are almost a thing of the past with foundries keeping the manganese up to the limits prescribed above, where previously much trouble was due to that cause. To overcome this it appears that one-quarter of one per cent. should be present in the wheel. Ferro-manganese, however, seems to reduce the chill by increasing the graphitic carbon, and this must be allowed for in proportioning the charge for the cupola. The combined carbon is partly changed to graphite, but not entirely in proportion to the amount of ferro-manganese used.

Mr. Henderson closes his paper with a set of specifications for charcoal iron and coke iron suitable for car wheels, also with a set of general specifications which wheels must meet for acceptation. He says that in preparing specifications for charcoal irons there is great difficulty in getting satisfactory limits, and therefore the specifications which he offers are put forward rather for criticism than as being final. These specifications designate the limits of graphitic carbon, combined carbon, silicon, manganese, sulphur and phosphorus.

The M. C. B. Coupler.

In our issue of March 24 was published a progress report of the Western Railway Club Committee on M. C. B. Couplers, which divided the couplers into groups according to the number in use June 30, 1897. In the first group of 10,000 or more in use the names of nine makers appeared, and there were thirteen makers in the second group having less than 10,000 and more than 1,000 couplers in service. It will be remembered that this Committee was made up of Messrs. Delano, Barr, Mackenzie, Peck and Fildes, and that it has been investigating this subject since the October meeting; the final report was made at the April meeting, which we give practically in full.

In a paper presented by Mr. Peter H. Peck to the Western Railway Club at the October, 1898*, meeting, entitled, "The Adoption of a Standard Knuckle," attention was drawn to the enormous expense to the railroads of this country, arising from the multiplicity of the M. C. B. couplers and to the necessity entailed on railroads of keeping a large supply of extra knuckles on hand for emergencies or repairs, indicating clearly the great desirability, either of having fewer couplers or an interchangeable knuckle. Certainly, Mr. Peck recognized that to adopt a uniform or interchangeable knuckle was impracticable, and that to specify the use of a uniform or standard knuckle was tantamount to requiring the adoption of a uniform or standard coupler. Your committee regards any such attempt, however desirable, as wholly impossible, and looks for an improvement in the present mixed conditions through the operation of the law of evolution, which shall, as time goes on, weed out the weak and objectionable and allow the fittest to survive. Indeed, there is strong evidence that this is already taking place. The committee further believes that this process of evolution can be hastened by an intelligent investigation of the situation by specifications requiring accuracy of contour lines and good material, and by careful records of coupler failures in service. As has already been pointed out in discussions of this matter, M. C. B. couplers have heretofore been regarded as of sufficiently equal merit to allow the matter of choice, at least with many railroads, to depend largely, if not wholly, on the price quoted.

In the preliminary reports of this committee a list of the couplers in use has been given, and from that it will be seen that there have been in use on railroads of the United States upwards of 100 different M. C. B. couplers. Of this number certainly not more than ten or twelve are likely to long remain standard couplers. The other ninety must fall by the wayside for defects which have developed in service.

From the mass of suggestions and information which has been received, the following general recommendations are offered:

1. Railroad companies should purchase couplers on specifications requiring:

(a) Accurate agreement with M. C. B. contour lines. By this is meant, not simply that the limit gage may be introduced, but that the lines of the coupler shall coincide with the M. C. B. lines when referred to the center lines of the shank produced.

(b) Couplers must be made to withstand shock and a fair proportion of all purchased should be tested under a drop test.

(c) Couplers must be strong in tension and a proportion of them should be tested under tension.

2. It is thought that the length of guard arm should be specified by carrying the M. C. B. contour lines about ¾ of an inch further than at present, modifying the present M. C. B. limit gage, as shown in the figure below. In this figure is also shown the center line marked on the gage and further located by center pin or post holes, A, as a means of attachment to a supplementary gage to be clamped on the coupler shank. There would be a further improvement if the radius of the curve at the point of the guard arm were specified to be not less than $\frac{3}{16}$ of an inch.

3. Your committee wishes to dwell upon the importance of service records of couplers and feels that there is nothing that will so soon point out the defects in apparently meritorious devices. At the present time there are no good data on the comparative wear of couplers, and this important feature of the question can only be determined by the most accurate service records. The interchange of cars makes the defect of every coupler a matter of concern to every railroad company. No railroad company can afford to neglect this question, because it is itself purchasing a satisfactory coupler.

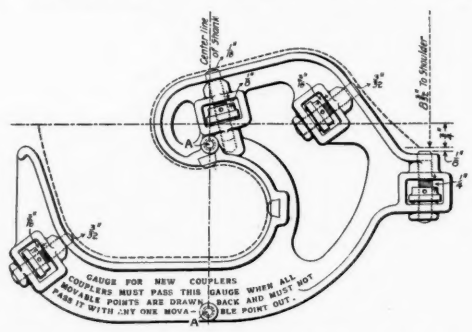
4. The question of the location of the pivot pin hole and suggestions looking to greater accuracy in forming this hole, so as to avoid much lost motion, is certainly an important consideration, but your committee is not prepared at this time to offer a recommendation upon it.

5. Your committee is impressed with the necessity of a positive locking device, one which will not allow the locking pin or block to "jump" or "crawl" and so permit cars to become uncoupled. Notwithstanding this, however, your committee has no recommendations to make, except to state that no such device, however meritorious it may seem, should be adopted until after a very thorough service test. It has already been proved that some of these apparently "positive locks" have proved worse than useless and, in some cases even, very objectionable.

6. The method of uncoupling is one which deserves consideration, and which, in the opinion of your committee, is susceptible of improvement. There can be no question but that "break-in-twos" have frequently occurred in service from the uncoupling devices now in use. The most familiar way of lifting the locking pin or lock block is by a chain and tumbling shaft fastened to the end sill or deadwood. In case the coupler drawbar pulls out beyond a certain point, the pin or lock block is raised or withdrawn and the car becomes uncoupled. That there are other objections to at least some of the devices designed to take the place of the chain and tumbling shaft are admitted, and your committee does not feel prepared to make any recommendations on this point, further than to call attention to its importance.

7. Some couplers are furnished with what is called a lock-set. This is a very desirable thing in switching cars, and, we might say, essential to the perfect coupler, yet it should be borne in mind that in adding any complication to the coupler there should be a very careful investigation of its operation in service. The criticism which has been made that M. C. B. couplers, instead of being automatic couplers, are automatic uncouplers, has arisen almost entirely from the defects introduced by attempting to devise a satisfactory lock-set.

8. On the general question of M. C. B. couplers, your committee desires to put itself on record as believing that the lines of the M. C. B. Committee will prove entirely satisfactory, and that there is no necessity for a divergence from them. As already stated, the length of the guard arm should be produced somewhat and the relation of the contour lines to the center line of the shank should be adhered to strictly. Your committee understands that the Committee of the M. C. B. Association has already designed a gage which can be slipped over the shank of the coupler and so fix absolutely the relation of the center line of the shank to the contour line, and your committee urges very strongly that such a gage be adopted.


Center line of Shank
To Shoulder
A
GAUGE FOR NEW COUPLERS
COUPLERS MUST PASS THIS GAUGE WHEN ALL MOVABLE POINTS ARE DRAWN BACK AND MUST NOT PASS IT WITH ANY ONE MOVABLE POINT OUT.

M. C. B. Limit Gage, amended to give guard arm limit, also with center pin or post holes (A) on line of shank for attachment of supplementary Gage.

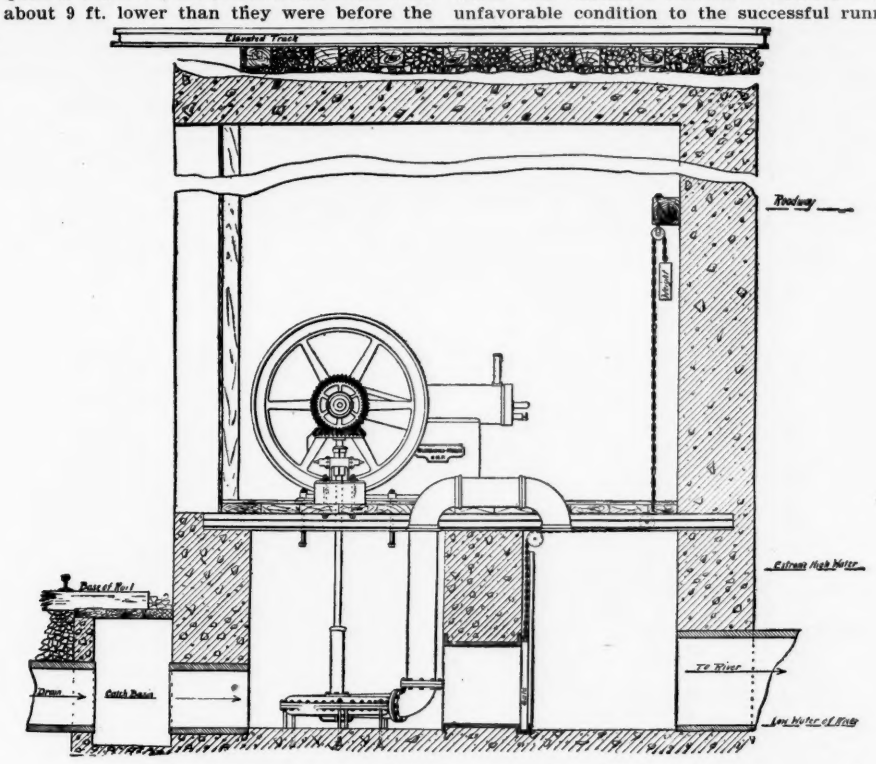
In the main, there can be no question but that the M. C. B. coupler has proved immensely superior to the link and pin coupler, and what is needed more than anything else is an insistance on a compliance with the M. C. B. contour lines, and rigid requirements as to strength.

The committee consisted of Messrs. F. A. Delano, J. N. Barr, Thos. Fildes, John Mackenzie and Peter H. Peck.

*See Railroad Gazette, Nov. 11, 1898, p. 807.

A Pumping Station for Track Drainage.

In connection with the track elevation and depression at Sixteenth and Clark streets, Chicago, it was necessary to dispose of the surface water which accumulated in the depressed tracks of the Chicago & Western Indiana with its allied lines, and the Atchison, Topeka & Santa Fe, the tracks of the latter road being about 9 ft. lower than they were before the



Gasoline Engine Pumping Station, Sixteenth & Clark Streets, Chicago.

changes were made. On either side of these tracks a concrete retaining wall, as shown in the accompanying half-tone, has been built.

The river, which is about 200 ft. from the tracks at this place, varies in height and sometimes the water rises above the level, for which drainage had been provided. When the water is low the drainage is by gravity, but when the river rises above the normal it is necessary to use other means to carry off the surplus water.

Major G. W. Vaughn, the engineer who has had entire charge of the work, devised a simple and economical means of overcoming the difficulty. The drainage provided for the tracks consists of a series of 24-in. pipes laid parallel to and between the tracks the entire length of the depressed section. The water is thus discharged into reservoirs at a convenient point, where cross pipes carry it into a pumping and receiving well, placed within the retaining wall in a central point in the work. As shown in the accompanying line cut, an arch is formed in which has been built a collecting basin to a depth of 5 ft. below the level of the tracks, the bottom of which is practically level with the mean low water level in the river. Between this reservoir and the one discharging into the river is a wall 5 ft. in height through which are led three 24-in. pipes, provided with flood gates on the river side. This controls the flow of water in such a way that during low stages of the water these flood gates may be left open and gravity flow permitted, but as the water in the river

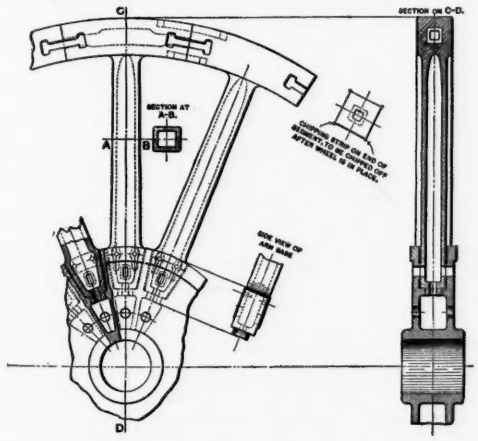


Fig. 4.

rises, the flood gates may be closed and the entire 5 ft. used as a head by pumping over this wall, as shown in the line cut, which is a section showing the basins previously referred to and the driving machinery.

The plant for this drainage consists of two 8-h. p. Fairbanks-Morse gasoline engines, each driving a centrifugal pump. These engines are connected by bevel gearing to No. 6 vertical centrifugal pumps, each with a capacity of 2,250 gals. a minute. Clutches are provided so that the pumps are disengaged when the engines are to be started. After the engines have been set in motion these friction clutches connect the engines with the centrifugal pumps.

Everything seemed favorable to the use of a gasoline engine in place of steam or electricity for this work. The excessive amount of moisture was an unfavorable condition to the successful running of electric motors and the irregular work required of the engine gave a marked advantage of the gasoline over the steam engine.

These engines may be kept working steady for two or three weeks and at some seasons will not be used at all for this length of time, so that what would be trying conditions for steam or electricity are favorable to the gasoline engine. One feature may be noted, that these engines require but little attention, and the services of a skilled engineer to run them are not required.

Rolling Mill Fly-Wheels.*

By Mr. John Fritz.†

In the early days of rolling mills, the machinery was of the crudest character. The men who built and looked after it were called millwrights, or forge carpenters; consequently, wood was used in its construction to as great an extent as was possible. All of the earlier fly-wheels, at least so far as I know, had wooden arms. They were made of hard wood, locust or white oak preferred, and about six to eight inches in thickness. The segments of the rims were in halves, and secured together with gibs and keys. Having no machine tools when these wheels were built, they were put together practically as the castings came from the foundry, with the lumps and swells chipped off with a two-handed chisel and sledge, which naturally caused a weak wheel. They were made of cold blast charcoal iron, which was greatly in their facor, and no doubt this fact prevented many accidents.

In the course of time the millwright and carpenter were displaced by the machinist, and with the introduction of machine tools, especially the planer, the wheels were better fitted up, but not much safer, in consequence of the use of iron, made from mineral coal, in place of charcoal.

The machinist now became the mechanical engineer, and wood not being his forte, he made the fly-wheel all of cast iron, as shown in Fig. 1. The center, arms and segments were cast separately, and had the ends of the segments been well fitted together, the wheel would have given no trouble. The slots for the tees were, unfortunately, too close to the end of the segment; the result was that they pulled the end of the casting off, and we had to chip grooves across the face of the wheel, and put heavy links around them, as shown in Fig. 2, which made a good wheel out of it. This was done in 1854, and I think the wheel is yet in use, but never ran at high speed.

Not considering these wheels safe, I was in constant fear of their going to pieces, which is generally attended with the most disastrous results. I abandoned entirely the old mode of making wheels, and adopted plan shown in Fig. 3—casting the center and arms together, and the rim in one piece, with lugs on the inside of the rim, as shown. On the ends of the arms were pads to correspond with the lugs on rim. When the arms were put in the rim, there was a space of about one-quarter of an inch, in which oakum was driven tightly, which kept the arms in place. This made an excellent wheel, and in some cases wood was used to fill the space in which thin steel keys were driven. There are several of these wheels that have been in us over 35 years, and, so far as I know, never have given any trouble. The wheels were 20 ft. in diameter, with rims about 12 in. square.

With the introduction of steel for rails and structural material, it became necessary to increase the diameter of rolls. This change necessitated heavier wheels, and larger in diameter, which made it impracticable to use solid rimmed wheels; consequently, some plan that was portable had to be adopted. After much thought the plan represented by Fig. 4 was concluded the best and safest, and there are now a number of wheels of this type in use, varying in diameter from 20 to 30 ft. I do not know that any one of them ever has given a particle of trouble in any way, and a number of these wheels have been in use for 25 years, some which have, and are daily liable to encounter, the most severe strains that it is possible for a fly-wheel to be subjected to, and are to-day apparently as safe as the day they were started.

It has been said that fly-wheels go to pieces in consequence of the irregular work, and engines driving dynamos for power purposes have been included in this class; but the strain on a fly-wheel driving a dynamo cannot be compared with that of a rolling mill. In the former the work occasionally varies from nil to full power, while that of an engine driving a rail mill changes from nil to practically full power while rolling a single rail twelve times, which requires about one minute.

Let us for a moment think of a fly-wheel 26 ft. in diameter, 16-in. rim, making from 70 to 80 revolutions a minute, rolling a steel bloom into a rail. When about one-half done, say, about 16 ft. in length, instead of the piece going straight out, through the rolls on the guides, as intended, it sometimes wedges in the groove, and in less than a second of time it has completely encircled the roll, and forms what in rolling mill phrase is called a collar, and continues to wind around the roll until something must happen, either the breaking of a roll, a spindle, or coupling, or the engine must be brought to a standstill in an almost incredible short space of time. The tortion on the spindles and couplings is so great that it causes the wheel to rebound. To calculate the strain the wheel is subjected to under these conditions will require some one better posted in mathematics than I am.

Having alluded to the fact that the introduction of steel in various forms required larger rolls, heavier wheels, and larger in diameter, which made it impracticable to use a solid rimmed wheel, led to the

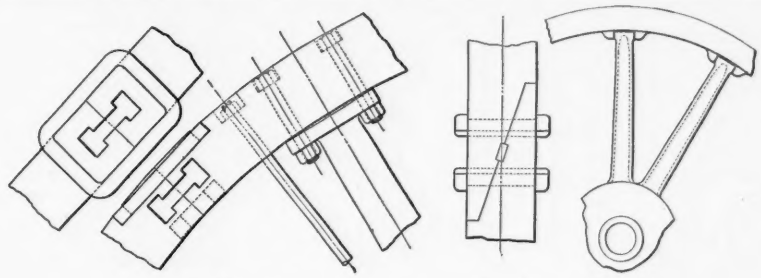


Fig. 1. Fig. 2. Fig. 3.

Rolling Mill Fly Wheels.

adoption of plan of wheel, Fig. 4. The segment is cast hollow, and also the arms, which are made at the ends to compare in thickness to the segment, so as to relieve them of strains which might occur if the segments were cast solid. The holes in the segments are small at the ends, so as to make up for the metal taken out for the tees. The links, or tees, are different lengths, so that the strain on the segments will not come all at one place, and by using oil-tempered steel in the links, or double tees, the rim will be practically as strong at the joints as it is elsewhere.

In fitting up the wheel, the center is bored out, and the ends of the hub faced off. It then is taken to the planer, and a center-guide plate for the hub is made, and bolted to the planer table. Then a boring bar is arranged to bore out the hole and face it off to a given distance from the center for the shoulder of the arm to rest on. There are small chipping pieces on both inner sides of the receptacle for the arm. They are planed off at the same setting, to the proper and uniform width, and true to the center. This finishes the center.

Next the arm goes on the planer and is set true to the average center, and with a socket on the end of the boring bar with inside cutters the end of the arms is turned off, and the shoulder is faced off to the proper length for the arm to rest on; so at this setting the chipping piece on the upper side of arm, as it lies on the planer, corresponding with the same in the center, is planed off, and the average center of the segment is also carefully taken and correctly worked.

After the arms are thus far finished, they are placed on the planer again, the other side up, and a socket is made to fit over the end of the arm which goes into the socket and against the shoulder. On the opposite end of the socket is a hole bored, say, 1½ in. or 2 in. in diameter. The length of arm must be, from the center of the hole to the bottom of socket which arm rests on, the same as the distance from the face upon which the arm rests to the center of the hole in shaft.

Next secure a pin on the planer bed to correspond in size with the hole in the end of socket piece. Then put the socket on the end of the arm and on the pin; then bolt the arm down true on the side that is planed, and finish to the proper size. When this is done, find the exact length of the segment and set it

* Presented at the Washington meeting of the American Society of Mechanical Engineers, May 9-12, 1899.
† Member of the Society and Past President.

in line with the center, and you have the exact angle, and when all is done correctly the wheel will fit together without a chisel or a file being used on it, and will run true, without turning, minus the irregularities in the castings.

You will notice there are no abrupt changes in the thickness of the castings, thus avoiding as much as possible the liability of the strains. The joints in the segments are generally the weak part of the wheel. In this respect a wheel made from this drawing will be stronger than the original, as the tees in the segments in the wheel now in use were made of wrought iron, and will probably not stand over 50,000 lbs. tensile per sq. in., while in this wheel, if I was to build another, I would use steel that would stand at least 85,000 lbs. tensile. This would make the joints practically as strong as the segments.

It will be noticed on tracing there is a space in the center of about ¼ in. in front and rear side of each arm. This is filled with oakum and driven hard, after the wheel is finished and in place, to keep the arm from yielding in the direction of the strain, and at the same time greatly lessens the work of fitting up the wheel. The 1¾-in. round holes shown on tracing, through the center and arm, are reamed out, and steel pins made and turned so that they will drive in snugly.

The bolt shown in segment in Fig. 1 does not belong to this wheel, but was simply put in there to show the plan that, in many cases, was adopted to make the wheels more secure, and is used to some extent at this time.

The Supreme Court on Mileage Tickets.

The full text of the decision of the United States Supreme Court in the Michigan mileage ticket suit contains a number of paragraphs which will be of general interest. Mr. Justice Peckham, who writes the decision, holds that for a state to fix maximum rates and then fix a lower maximum for a special class of citizens is "a pure, bald and unmixed discrimination."

The suit, which was originally brought by Henry C. Smith, of Adrian, against the Lake Shore & Michigan Southern, was for refusal to sell a mileage ticket, good for Smith and his wife, at $20 for 1,000 miles, under the law of 1891, which required the sale of such tickets and stipulated that they should be valid for two years. The Supreme Court of Michigan decided in favor of Smith and the railroad company appealed, setting up that its charter, allowing it to charge three cents a mile, constituted a contract between the state and the company; that the statute was in violation of the 14th amendment to the Constitution of the United States, and was repugnant to the constitution of the state of Michigan. The Supreme Court of the state decided that there was no contract, but held that the statute was constitutional.

Justice Peckham holds that the act deprives the corporation of its property without due process of law. The state may make maximum rates subject to the condition that the carrier shall be able to earn a just compensation. In I. C. vs. Ill. (163 U. S. 142) the Supreme Court held that the state of Illinois could not compel the Illinois Central to stop its fast mail train at Cairo, it being necessary to run three miles away from the main line to do so; this was an unconstitutional interference with interstate commerce. In L. S. & M. S. vs. Ohio (173 U. S. 285) the state of Ohio was sustained in requiring certain trains to stop at villages of 3,000 inhabitants, the statute having a substantial relation to public convenience and only incidentally affecting interstate commerce.

The police power of a state, which means its power to regulate the relations of men and things within its dominion, must be exercised in subordination to the Federal Constitution, and the question here is whether the Legislature of the state, having power to fix maximum rates and to alter or repeal the charter of a railroad, has also the right, after having fixed a maximum rate for the transportation of passengers, to still further regulate their affairs and to discriminate and make an exception in favor of certain persons, and give to them a right of transportation for a less sum than the general rate provided by law. It is said that the power to create this exception is included in the greater power to fix rates generally; that having the right to establish maximum rates, it therefore has power to lower those rates in certain cases and in favor of certain individuals, while maintaining them or permitting them to be maintained at a higher rate in all other cases. It is asserted also that this is only a proper and reasonable regulation. This claim does not seem to be well founded. This exceptional legislation cannot be regarded as the exercise of a lesser right which is included in the greater one to fix by statute maximum rates for railroad companies. The latter is a power to make a general rule applicable in all cases and without discrimination in favor of or against any individual. It is the power to declare a general law upon the subject of rates beyond which the company cannot go, but within which it is at liberty to conduct its work in such a manner as may seem to it best suited for its prosperity and success. . . . The statute invades the general right of a company to conduct and manage its own affairs, and compels it to give the use of its property for less than the general rate to those who come within the provisions of the statute, and to that extent it would seem that the statute takes the property of the company without due process of law.

Of course, the company is subject to the power of the Legislature to provide for the safety, etc., of the public and to prevent extortion. The right to claim from the company transportation at reduced rates by purchasing a certain amount of tickets is classed as a convenience. As so defined it would be more convenient if the right could be claimed without any compensation whatever. But such a right is not a convenience at all within the meaning of the term as used in relation to the subject of furnishing conveniences to the public. The Legislature must not protect the convenience of a small portion of the traveling public while refusing it to all others. The right to obtain tickets for less than the general rate is not properly a convenience. To compel a road to favor a particular class is not reasonable regulation. This act cannot be defended by likening it to a law requiring reduced fare trains at certain hours; such trains are for the whole public during those hours.

If the Legislature can declare a ticket valid for two years, why not for five years? And if for five, why not for ten? Circumstances may change. There is no particular time in regard to which it may be said in advance and as a legal conclusion that circumstances will not change. And can the validity of the regulation be made to depend upon what may happen in the future, during the running of the time in which the Legislature has decreed the company shall carry the purchaser of the ticket? Regulations for maximum rates for present transportation of persons or property bear no resemblance to those which assume to provide for the purchase of tickets in quantities at a lower than the general rate, and to provide that they shall be good for years to come. This is not fixing maximum rates, nor is it proper regulation. It is an illegal and unjustifiable interference with the rights of the company. If this power exist it must include the right of the Legislature, after establishing maximum freight rates, to also direct the company to charge less for carrying freight where the party offering it sends a certain amount, and to carry it at that rate for the next two or five or ten years. The Legislature would thus not only permit, but compel discrimination. It may be said that the Legislature might reduce all fares to the rate now prescribed for thousand-mile tickets, but there is no evidence that it would have any such right; such a reduction migh reduce the earning power of the road below a reasonable limit, thus making the law unconstitutional. The Legislature has fixed the general maximum at three cents. In the absence of further action by the Legislature this rate must be presumed to be reasonable.

The Legislature having fixed a maximum rate at what must be presumed, prima facie, to be also a reasonable rate, the company then has the right to insist that all persons shall be compelled to pay alike, that no discrimination against it in favor of certain classes of married men or families, excursionists or others, shall be made by the Legislature. The company has voluntarily sold thousand-mile tickets good for one year, but this furnishes no criterion for the measurement of the power of a Legislature. The action of the company upon its own volition, purely as a matter of internal administration, and in regard to the details of its business which it has the right to change at any moment, furnishes no argument for the existence of a power in a Legislature to pass a statute in relation to the same business imposing additional burdens upon the company.

The Legislature may absolutely repeal the charter of a company, but this does not take away its property. The power to enact legislation of this character cannot be founded upon the mere fact that the thing affected is a corporation, even when the Legislature has power to alter, amend or repeal the charter thereof. The power to alter or amend does not extend to the taking of the property of the corporation either by confiscation or indirectly by other means. The authority to legislate in regard to rates comes from the power to prevent extortion or unreasonable charges or exactions by common carriers or others exercising a calling and using their property in a manner in which the public have an interest.

The Michigan statute is a discrimination in favor of a few of the persons having occasion to travel, permitting them to do so at a less expense than others, provided they buy a certain number of tickets at one time. There is no reasonable ground upon which the legislation can be rested unless the simple decision of the Legislature should be held to constitute such reason. Whether the Legislature might not in the fair exercise of its power of regulation provide that ordinary tickets purchased from the company should be good for a certain reasonable time, is not a question which is now before us, and we need not express any opinion in regard to it.

The judgment of the Supreme Court of Michigan is reversed. The Chief Justice and Mr. Justice Gray and Mr. Justice McKenna dissented.

Taxation of Private Owners' Cars in Colorado.

The decision of the Supreme Court of the United States on the taxation of refrigerator cars in Colorado, the full text of which is now at hand, ought to finally settle the question of State taxation of cars used in interstate commerce; at least it is difficult for the layman to discern any valid grounds for further contesting the thrice repeated opinion of the majority of the Supreme Court. The present decision is practically made up of extracts from the opinions of the court in three former cases which presented almost exactly the same questions. The suit was that of the American Refrigerator Transit Co., of Illinois, to restrain the collection by the State of Colorado of taxes on 40 refrigerator cars owned by the company and used for business between points in Colorado and places in other states. A much larger number of cars ran to or from Colorado during the year, but it was agreed that 40 was the average number used within the State of Colorado; and the State assessed these cars at $250 each, the owner having agreed that the cars were worth at least this sum. The opinion, by Justice Shiras, cites the decisions of W. U. Tel. vs. Mass. (125 U. S. 53), P. P. C. Co. vs. Penn. (141 U. S. 18), A. Ex. Co. vs. Ohio (165 U. S. 194). A State having the right to tax any personal property found within its jurisdiction, without regard to the owner's residence, the court approved the rule of the State of Pennsylvania by which sleeping cars are taxed on the basis of the company's capital stock; the ratio of the mileage of the company's cars in the State to the whole mileage in all States being taken as the ratio of the capital taxed in Pennsylvania to the whole capital. In the case of the Adams Express Co. the tangible property in all States was $4,000,000, but the capitalization of the company was $16,000,000, and the court approved the taxation of a portion of the $16,000,000 in Ohio, though three-fourths of it was intangible property. "No fine spun theories about situs should interfere to enable large corporations doing business in many States to escape bearing in each State such burden of taxation as a fair distribution of the actual value of their property among those States requires." Colorado imposes no burden on the business of the plaintiff, but taxes only property situated within the State, and it was competent to ascertain the taxable number of cars by computing the average as above described. Therefore, the judgment of the Supreme Court of Colorado, sustaining the validity of the taxation, is affirmed.

The Ohio Train-Stopping Law.

To interstate railroads the decision of the United States Supreme Court sustaining the Ohio law requiring trains to stop at certain villages is a matter of importance. The demands of the public at the present day require fast through passenger and mail trains; if every little town on the route of fast trains can get the Legislature to order such trains to stop there, fast time through is out of the question. It has been supposed that any such law would be an unconstitutional restraint upon interstate commerce, but the United States Supreme Court is authority for the opposite doctrine.

The Ohio law requires every road to stop three regular passenger trains each way daily, if so many are run, at all villages of over 3,000 inhabitants. The Lake Shore & Michigan Southern disregarded the law, and a citizen of West Cleveland made the complaint which has led to the present decision. The Lake Shore, to comply with the law, would have to stop a train at 13 places, which would make an aggregate detention of at least 39 minutes. All of the courts, from the lowest to the highest, held that this was not a regulation of interstate commerce; therefore, the law is valid until Congress shall make an interstate commerce regulation which conflicts with it.

The Supreme Court decided the case by the smallest possible majority, Justices Shiras, Brewer, White and Peckham dissenting. The decision, by Justice Harlan, holds that a state may regulate not only the health, morals and safety of the public, but also whatever promotes the public peace, comfort and convenience. Section 5258 R. S., which concerns the transportation of troops, Government supplies, etc., is not interfered with by the Ohio law. The railroad argued that a state regulation interrupting the continuous freedom of interstate commerce was forbidden by the constitution, although Congress may not have legislated upon the point; but the court refuses to sanction this view. The gist of the decision is that the state of Ohio, having granted all the powers possessed by the Lake Shore & Michigan Southern Railway, may rightfully demand that the main purpose of the road shall be to serve the people of that state. Justice Harlan holds, evidently, that three trains each way daily is a fair minimum number for a road running through villages of 3,000 inhabitants, and that if the company desires to carry passengers in quick time through from Buffalo to Chicago it should put on a fourth train. The statute only regulates the use of a public highway, established by the state, in such a way as to reasonably promote the public convenience. It is not directed against interstate commerce, but only incidentally affects it.

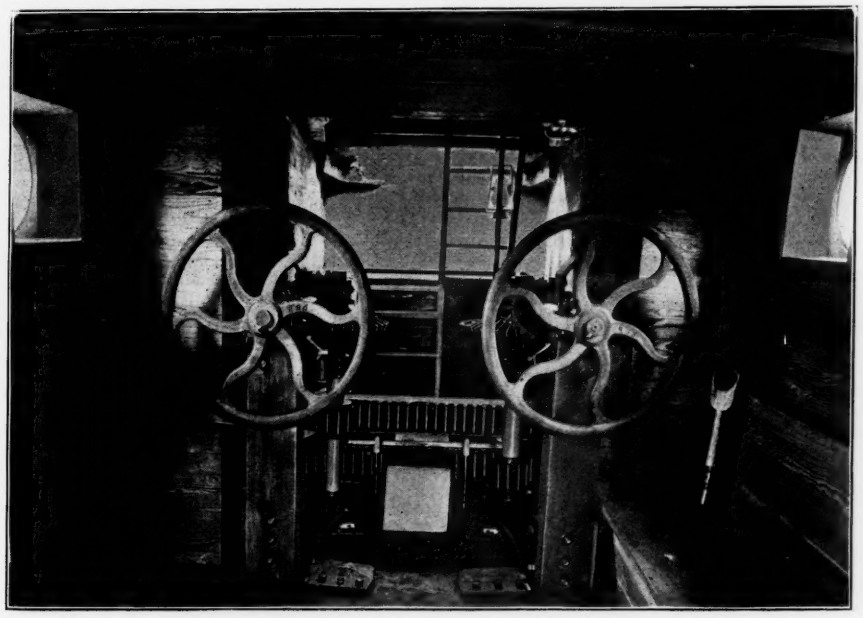
Justice Shiras, in the dissenting opinion, points out the different conditions attaching to through business. Provision must be made for sleeping at night and for furnishing meals. Tickets must be sold in advance. A company which should either voluntarily or under coercion of a legislature stop its through trains at every village would soon lose its through

business. Moreover, if, as often happens, a through train is full, it is no advantage to the small station for the train to stop. The Ohio statute was not enacted to promote the public interest, but rather the public interest of the state of Ohio only; it is a discrimination in favor of local interests. If each state can give preference to the convenience of its own people, we shall have a restoration of the confusion of interstate commerce that existed before the adoption of the Federal constitution.—Commercial and Financial Chronicle (condensed).

A Russell Snow Plow.

The engravings show one of three large wing-elevator snow plows recently built by the Russell Snow Plow Co. for the New York Central & Hudson River Railroad. Eight of these machines were built by the company during the last season, and orders for others were received but could not be filled.

The exterior view shows size No. 2 of the Russell wing-elevator type, as built for the Western Division



The Russell Wing-Elevator Snow-Plow—Interior View.

of the New York Central. The extreme length of this snow plow is 44 ft., its height 13 ft. 10 in., width at the front 10 ft. 1 in., width with both wings fully open 16 ft. 4 in. It weighs, without ballast, upwards of 70,000 lbs., and is carried on eight wheels. The forward truck is of special design, having eight journals.

The interior view shows the working gear of this same snow plow. The hand wheels, bevel gear and rack and pinion by which the wings are worked, are fairly well shown by the engraving. In past years we have illustrated very fully the construction of this snow plow, and probably those of our readers who are interested in the matter are quite familiar with it.

The Boston Southern Station.

TRACK FACILITIES AND INTERLOCKING.

By J. P. Coleman.

The capacity of a terminal station is popularly reckoned from the number of tracks contained in its train shed; it is more properly reckoned from not only the number of such tracks, but from the number of cars they are capable of holding, also. It is correctly determined only by a consideration of these two features and one other of equal or greater importance—the switching facilities provided for simultaneous train movements into and out of the station. A certain large terminal in this country has 30 tracks in its train shed, with an approximate total capacity of 279 cars, yet the switching facilities of this plant permit of but four simultaneous movements to or from the station.

In the train shed of the new Boston Southern station there are but 28 tracks (exclusive of the four suburban loop tracks beneath it) which provide accommodation for 344 cars, and its switching system permits a simultaneous entrance or exit of 11 trains to or from the train shed on the surface tracks alone. It is manifest that if the 750 trains which will eventually use the Boston station daily make full use of the facilities provided for them, the first mentioned station would prove inadequate to such service.

While the new station provides on its surface tracks for a larger train movement than has ever been before attempted in this country from a single station, the additional accommodations afforded by the loop tracks beneath it place it foremost in the list of the world's great railroad terminals with respect to traffic possibilities. This loop is designed to accommodate the suburban traffic of the several roads using the station, and was arranged in contemplation of the eventual use of either electric or pneumatic locomotives for this service.

This anticipation was based largely upon the success of the third rail method of propulsion that has been in service for several years on the Nantasket Beach line of the New York, New Haven & Hartford. Manifestly the use of the steam locomotive upon the loop tracks would prove objectionable on account of the effect of the gases and smoke generated by them upon passengers as well as upon the general cleanliness of the station, so that until some economical substitute for the steam locomotive has been decided on and adopted for suburban use the loop will probably remain idle. When it is called into use, to the suburban lines this new station will not be a terminal, but, in effect, a way station, since trains entering will pass under the train shed floor, discharging and receiving passengers in the basement of the head house, and will continue in a loop to the point of entrance, where their exit will be made over lines parallel with those upon which they enter; these gradually rising to and having connections with the steam line approaches to the station. How soon the suburban lines will utilize this loop and how soon its full capacity will be demonstrated cannot at present be stated, but the first important demonstration of the station's capacity will be made during the coming summer, when trains of all the roads entering Boston from the south will make it their terminal. These comprise the New York, New Haven & Hartford, the Boston & Albany, the New York & New England and the Old Colony railroads and the Boston & Providence Corporation, all of these except the Boston & Albany being now operated by the New York, New Haven & Hartford.

The center of interest at present, therefore, lies in the equipment arranged for handling on the 28 surface tracks in the station and their approaches, the 700 and more trains expected shortly to enter and leave them, without confusion and delay, during practically 18 hours out of every 24. The precise manner of operating the station has not yet been determined, but there is little doubt that the ultimate method will be to assign to each division a number of tracks for its use—exclusively if possible—rather than to divide the station into halves, one for inward and one for outward trains of all divisions, as was at one time contemplated.

Greatest economy of track room during regular service and the necessity for additional facilities during emergencies will probably demand the adoption of the former plan, under which certain tracks will have to be used by trains of two divisions at different periods of the day, in all probability.

The track arrangement is fully shown by the plan; and the symmetry and compactness of the whole well illustrates the close attention given to this feature in designing the station. There are only two curves exceeding 10 degrees, no special frog construction is involved and crossing angles and switch leads are uniform, while the arrangement provides unusual opportunities for the concentration of signals on overhead structures and for the simultaneous movement of many trains from track to track over crossover switches.

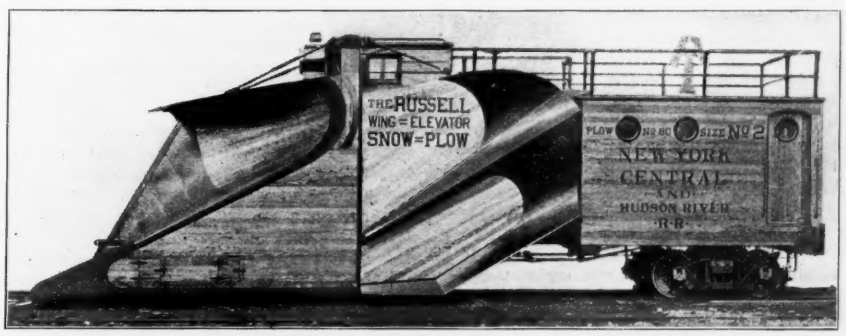
The switches and signals are operated under the Westinghouse Electro-Pneumatic Interlocking system, which is in course of erection by the Union Switch & Signal Co., of Swissvale, Pa. The track arrangement comprises two pairs of parallel mains laid diagonally across the eight running tracks approaching the shed. At each point of intersection formed by these diagonal tracks and the running tracks a slip switch with movable frogs is formed, by aid of which movements may be made from any track in the station to any of the approaching mains.

Eight main line trains may move simultaneously into or out of the station completely through this system, while three like movements may be made to and from the express yard, the storage yard and the power house tracks, making possible a total of 11 simultaneous through movements on the surface tracks alone. For these 11 movements 48 signals will be worked, out of a total of 148 provided for all. Added to these are the two inward and the two outward movements that can be made at the same time on the depressed tracks of the loop, requiring four additional signals. The terminal, therefore, presents opportunity for the entrance or exit of 15 trains simultaneously, and its interlocking system provides for the simultaneous operation of 52 signals for these train movements.

The switches and signals of the surface tracks are operated from an interlocking tower located on the center line of the surface yard midway between its extremities, and known as Tower No. 1. Those of the depressed suburban tracks will be operated from one known as Tower No. 2, located upon the east retaining wall of the main yard at the west side of the subway, at its entrance to the station (under the surface tracks) and near the front of the train shed.

The number of signals required for an interlocking system is determined largely by the extent of territory covered by the tracks and by the frequency and nature of the train movements made over them. Considering safety alone, the minimum number of signals essential to the operation of any plant is represented usually by the number of tracks upon which trains may enter the switch system. When the territory covered is small, or the traffic light, or is composed wholly of "through" movements, as at grade crossings and junctions, the minimum number is usually ample. Where movements are not all "through," where the track system is of large area and where many movements are involved, necessitating frequent and rapid shifting of trains and engines, as at a large terminal station, many additional signals are necessary to insure expeditious service, hence the large number employed here.

Of these signals 128 are mounted upon nine iron truss bridges spanning the tracks governed by them. All signals are mounted on iron pipe posts, and conform to the New York, New Haven & Hartford standard with respect to form, position and color, which by virtue of a recent decision involves the use



The Russell Wing-Elevator Snow-Plow.

at night of a red light for danger, a yellow one for caution and a green one for safety. Below each of the 28 signals which govern trains starting from the station, there is a distant signal, which, when cleared indicates that all advance home signals of the routes governed by them are also at clear. There are also eight cautionary signals to govern trains inbound to the station. These are automatically controlled by rail circuits formed of the tracks from the bumping posts within the shed to their points of intersection without the shed. These signals move to safety with the home signals above them only when the shed tracks are unoccupied, and the failure of one to thus move with the signal above it is consequently an indication to an approaching engineer that the track he is about to enter is already partially occupied.

The switches and frogs used at the station were built by the Ramapo Iron Works and are made from the New York, New Haven & Hartford standard 100-

lb. rail, which rail is used throughout the yard. The slip switches and their movable frogs are supported by ⅝-in. x 7-in. plates, which extend from end to end of each tie under them. The Goldie tie plate is used on all curved tracks, and the movable frogs are of the clamped variety, with wooden foot guards inserted in their throats as required by law. The ties are of 7-in. x 10-in. yellow pine laid in 12 in. of gravel ballast.

The Old Colony Railroad (now Plymouth division, N. Y., N. H. & H.) whose former terminal was at Kneeland St., near the south end of the new yard, and the New England Railroad (now Midland division, N. Y., N. H. & H.) which formerly had its station on the site of the present head house, began using the new station on Jan. 1, 1899, and to accommodate the trains of these roads a portion of the terminal tracks was put in use on that day, with signals worked from a temporary pneumatic machine located in a temporary cabin near Tower No. 1, the yard not being then sufficiently completed to admit of the erection of all the signals and connections. In Tower No. 1, which was put into use May 7, there is a pneumatic machine having 143 levers, 130 of which will be in actual service for operating 91 high home signals, 36 cautionary signals, 21 dwarf signals, 31 double slip switches, 31 movable frogs and 49 single turnouts, or a total of 148 signals, and the equivalent of 233 single switches.

The interlocking machine in Tower No. 2 contains 11 levers, one of which is spare, and operates 8 dwarf signals, 4 double slips, 4 pairs of movable frogs and 4 single turnouts, the equivalent of 8 signals and 28 single switches.

Aside from its general advantages over mechanical interlocking for handling trains on so extensive a track arrangement as that of the Boston station, the pneumatic system possesses certain characteristics that were of such vital importance to the Terminal's interest that its adoption became almost a matter of necessity at this place. A mechanical apparatus in Tower No. 1 for working the switches and signals of the surface tracks in accordance with the best practices would involve the use in it of about 360 levers, which at the customary spacing of them (5-in. centers) would necessitate a tower at least 160 ft. long. The leadout for such a machine would occupy, if arranged in the usual manner, practically all of the space now devoted to the use of storage tracks capable of holding 67 cars. Evidently such a sacrifice could not be made, and by way of demonstrating a means of avoiding it, the leadout was arranged vertically along the wall of the subway, in one of the propositions made to the Terminal company, showing arrangement for a mechanical apparatus. It involved the use of rocker shafts of such a length, however, that their construction, to avoid undue loss from torsion in them, would have been cumbersome and otherwise unsatisfactory.

A second proposition for avoiding the sacrifice of the storage yard was the arrangement of the leadout over the subway upon a deck supported by beams extending from one retaining wall to the other. This arrangement, too, was unsatisfactory—first, because it necessitated many jaws, cranks and other connections which materially increased the already excessive loads put upon the levers (due to the heavy rails of the switches, and to the friction incidental to long connections between them and their operating levers; second, the objection to encumbering the subway with overhead structures outside of the station proper. The cost, too, of a mechanical interlocking was considerably greater than that of the pneumatic, both as to its erection and operation. Again, a mechanical tower would be so large and its leadout so extensive that it would have to be at the side of the yard, and so far from the central field of operation as to render a clear view from it of all the tracks impossible under many anticipated conditions. Not a small consideration, too, was that of the difficulties to be encountered in constructing permanently the leads of a mechanical plant on filled ground and under the adverse conditions presented for such work during the progress of other difficult engineering work interfering with these to a greater or less extent. When these difficulties were fully considered and when the ease by which they could all be overcome by the use of the pneumatic apparatus was made apparent, any questions that may have existed as to its entire suitability to the Terminal's conditions in other respects were at once set aside.

The advantages of the pneumatic interlocking system that were primarily instrumental in securing its adoption at the new station were summed up as follows: It required only about one-third the number of levers required by the mechanical system, and hence a correspondingly reduced force of men for its operation. It permitted, by reason of the smaller number and closer concentration in its machine frame of the levers involved, the use of a tower of but one-fourth the length of that required by the mechanical system. It therefore permitted the location of Tower No. 1 upon ground not required for other purposes and in a position giving the best view of the switches and signals operated. Having no movable connections between the tower and the switches and signals, it involved no likelihood of interference with its operation from future settlement of the filled ground.

The number of levers employed in the pneumatic system is subject only to the restrictions imposed by traffic requirements upon the number of switches or signals that may be operated simultaneously from one lever. It does not involve that physical restriction, peculiar to the mechanical system, resulting from the natural limitations of an operator's energy and of the period through which he is capable of exerting it. Instances are frequent in the Boston station interlocking plant where a single pneumatic lever operates a number of slip switches and movable frogs, their locking mechanisms and detector bars, that would require under the mechanical system four, and in some cases five, levers for their operation.

A peculiar method of mounting the pneumatic signal lever, too, permits the operation from it of more signals than is practicable from a mechanical one. These levers have a central position normally and are movable to the right and to the left of this position for working separately, but under the control of the locking, two or more signals governing conflicting routes, five or six signals frequently being operated by one lever in the Terminal's interlocking. The comparatively small number of levers used in the pneumatic machine is thus explained, and the concentration of these within half the space occupied by an equal number of mechanical levers is permitted by their peculiar arrangement and relatively diminutive construction. The absence of movable connections between these levers and the switches and signals they operate will be made evident, as will some other important differences between the two systems, by a more detailed description of its application to the new station which will appear in a subsequent article.

The plant will be under the direct care of a supervisor of interlocking, who will have charge of its operation and maintenance. The operating force will consist of a directing dispatcher and his assistant, a telephone attendant, a telegraph operator and three lever men during two of the day shifts; at night it will consist of a dispatcher, one operator and two lever men. The maintenance force will consist of a general repair man and his assistant during the day and an assistant repair man and helper during the night. The yardmaster will have direct charge of traffic and will have one or more assistants as circumstances may require. The maintenance of tracks will be under the roadmaster of the New York, New Haven & Hartford.

The directing dispatcher and his assistant will issue to the lever men orders for such manipulations of the interlocking apparatus as are necessary for the train movements to be made. The telephone attendant will control a switchboard and its connections with the various departments of the station proper and with the departments of the several roads using the station, while the telegraph operator will have charge of all telegraphic communications, train reports, records of delays, failures, etc. The lever men will manipulate the interlocking apparatus to permit the movement of traffic called for by the director. The directors and operators will be located at the station end of the tower in a bay window constructed so as to give opportunities for views of the tracks in all directions from it. The machine will stand with its length parallel to the tracks, the lever men facing eastward.

In addition to the telephone and telegraphic equipment mentioned, and such annunciators as may be used for announcing trains approaching the station, a set of 28 annunciators (one for each station track) will be arranged in the bay of the tower for the announcement by conductors of the readiness of trains to leave the station. At three points along each track within the shed special push buttons are provided for actuating these annunciators. Each conductor notifies the tower, and receives from the dispatcher a return signal which is sent by the act of the dispatcher in restoring the annunciator drops. Above these annunciators is arranged a set of 28 indicators (one for each shed track) which are automatically actuated by trains within the shed (by means of the rail circuits formed of the shed tracks), so that constant evidence is thus had of the presence or absence of cars upon these tracks.

Although the method of running the station does not contemplate train movements being made except in the normal direction, provision is, nevertheless, made in the interlocking apparatus for such movements. Signals cannot be given for these movements, however, without the co-operation and consent of the director, who, when the lever combinations have been made for them, may clear the signals permitting them, by means of a magnetic key under his control. The lever man has the power to restore to danger the signals thus operated, but cannot, under any circumstances, move them to safety unassisted by the director.

Such train movements should in general be prohibited, but owing to the large number of "shunts" or "drill" movements contemplated at this place, some doubt existed as to the possibility of avoiding movements against the usual movement of traffic, hence the provision made for them in the interlocking.

This provision naturally requires another in the signal system, which is to prevent the approach of trains toward the terminal, on the inward tracks, during outward movements on the inward tracks. These provisions being made, the maximum capacity of the station may be utilized in the event of emergencies without undue risk of collision between trains.

Train Accidents in the United States in March.

COLLISIONS.

Rear.

3rd, on Wabash road, near Delphi, Ind., a freight train broke in two and the rear portion afterward ran into the forward one, wrecking 12 cars and blocking the track of the Chicago, Indianapolis & Louisville, as well as the Wabash. A tramp was killed.

8th, 11 p. m., on Central of New Jersey, near Plainfield, N. J., a freight train broke in two, and the rear portion ran back into the head of a following freight, wrecking the caboose and four freight cars. A flagman who was asleep in the caboose was killed.

9th, 2 p. m., on Pennsylvania road, near Allegrippus, Pa., a westbound passenger train drawn by two engines ran into the rear of a preceding freight, badly damaging the second engine, completely wrecking the foremost one, which was lighter than the other, wrecking a very heavy (Class H5) freight engine, which was pushing the freight train, and also wrecking the caboose and two freight cars. The caboose took fire from the stove and was burned up. Two men in the caboose were, in some unexplained way, thrown out unhurt. The engineman and fireman of the forward passenger engine were killed. The signalman at IA tower, at the beginning of the block section, admitted the passenger train to the section without first making sure that the freight had cleared it. The signalman was arrested and held in $2,000 bail on a charge of manslaughter.

11th, on South Side Elevated railroad, at 61st street, Chicago, a train of which the motor was disabled and which was being pushed by a following train, ran into the rear of a preceding train, standing at the station badly damaging two cars; one passenger and one trainman injured.

15th, on New York, New Haven & Hartford, at Bristol, Con., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking four cars. A brakeman was injured.

15th, on Chicago, Burlington & Quincy, near Creston, Ia., a freight train descending a grade broke in two and the automatic application of the air brakes quickly stopped both portions of the train. A brakeman at once went back with a flag, but he was too late to stop a following freight train, and a serious collision occurred. The caboose and two cars of grain took fire and were burned up. Several passengers in the caboose of the foremost train got out just before the car was demolished.

17th, on Pittsburgh, Bessemer & Lake Erie, near Mercer, Pa., a freight train broke in two and the rear portion afterward ran into the forward one, wrecking 15 cars. Three tramps were injured.

19th, on Norfolk & Western, at Ada, Va., a freight train broke in two on a steep descending grade and the rear portion, when being dropped down to be coupled to the forward portion, was not properly controlled and two cars were considerably damaged, so that the train was delayed about three hours. Two freight trains following were stopped, one about a mile back of the first, and the other about 1,000 ft. back of the second train. The third train, after standing about three hours, started forward, the air having leaked off and the hand brakes not having been set, and collided with the second train. This train was jarred so seriously that the hand brakes were let off and the train started forward. The engine of this train had been detached and was being used to couple cars of the first train, and it was run into by its own cars and considerably damaged. The fireman was killed and a brakeman and a tramp were injured.

21st, 3 a. m., on Manhattan Elevated road, Third Avenue Line, near 18th street, New York City, a passenger train which had been unexpectedly stopped before reaching the station, was run into at the rear by a following collector's train, badly damaging one car. The fireman was injured.

22d, on Flint & Pere Marquette, near New Boston, Mich., a freight train ran into the rear of a preceding freight, wrecking the engine and 10 loaded cars. The fireman was killed and the engineman and two brakemen were injured. There was a dense fog at the time.

23d, on Boston & Maine, at Still River, Mass., a freight train standing at the station was run into at the rear by a following freight, and the engine and 11 cars were badly damaged. The wreck took fire from the engine and the 11 cars and their contents were entirely consumed. The station building was badly damaged. One trainman was injured.

26th, 4 a. m., on Pittsburgh, Ft. Wayne & Chicago, near Pittsburgh, Pa., a freight train ran into the rear of a preceding freight, wrecking the engine and 10 cars. The engineman and fireman were killed and another trainman was fatally injured.

31st, on Flint & Pere Marquette, at Clio, Mich., a freight train, which had been unexpectedly stopped at the foot of a grade, was run into at the rear by a following freight, and several cars were wrecked. The wreck took fire and the combustible portion of it was burned up.

And 8 others on 8 roads, involving 10 freight trains.

Butting.

1st, on Southern Pacific, near White Plains, Nev., butting collision between passenger train No. 1 and a freight engine, making a bad wreck. One engineman and two firemen were killed and one engineman and one brakeman were injured. It is said that the engineman of the empty engine misread a telegraphic order.

2d, on Chicago, Burlington & Quincy, at Blue Island avenue, Chicago, butting collision of freight trains; one trainman was killed and two injured, one of them fatally.

3d, on Norfolk & Western, at Breeden, W. Va., butting collision of freight trains, wrecking both engines and several cars of cattle. One engineman was injured. It is said that there was a mistake in reading telegraphic orders.

4th, 3 a. m., on Louisville & Nashville, at Kelly's, Ky., butting collision of freight trains, badly damaging both engines; one fireman injured. It is said

that the northbound train disregarded a telegraphic order.

4th, on Wabash road, at Decatur, Ill., the westbound Continental Limited express ran over a misplaced switch and into a switching engine standing on the side track, badly damaging both engines. Three trainmen and five passengers were injured.

8th, on Western New York & Pennsylvania, at Riverside, Pa., butting collision of freight trains; two trainmen injured.

8th, 11 p. m., on Union Pacific, near Piedmont, Wyo., butting collision between an empty engine and a passenger train, badly damaging both engines; both enginemen and both firemen injured. It is said that the engineman of the empty engine forgot about the passenger train.

10th, on Chicago & Grand Trunk, at Granger, Ind., butting collision between a westbound passenger and an eastbound freight train; one passenger and a man stealing a ride were fatally injured and one engineman was badly hurt.

12th, on New York, New Haven & Hartford, near Bradley's, Conn., butting collision of freight trains, one of which was running at full speed. Both engines and 12 cars were wrecked. One engineman was killed, one fireman fatally injured, and two other trainmen injured. There was a dense fog at the time of the collision.

30th, on St. Louis, Chicago & St. Paul, at Belltrees, Ill., butting collision of passenger trains, badly damaging both engines and the foremost cars in both trains. Two employees and three passengers were injured. The southbound train reached Belltrees a little behind time and was backing into the side track when the collision occurred.

And 2 others, involving 4 freight trains.

Crossing and Miscellaneous.

3d, 8 a. m., on Pennsylvania road, at Brunswick street, Jersey City, an eastbound passenger train of the New York, Susquehanna & Western ran into a switching passenger train of the Pennsylvania at a crossover track, badly damaging two Pullman sleeping cars. The connections of a gas tank were broken, the wreck took fire from the engine and three passenger cars were badly damaged by fire. The collision occurred on a part of the road which is on an elevated structure in the street.

5th, 11 p. m., on Lake Shore & Michigan Southern, near Westfield, N. Y., eastbound passenger train No. 10 collided with a switching engine and one mail car was overturned; four passengers and 10 trainmen and postal clerks injured.

13th, on New York & Brooklyn Bridge Railroad, at the Manhattan terminus, an empty passenger train was backed over a switch before the switch was properly turned, and collided with a passenger train from which the passengers were alighting. One trainman was injured.

18th, 2 a. m., on Grand Trunk, at Durand, Mich., collision between a freight train and a mixed train. The passenger car and one freight car were wrecked and destroyed by fire.

21st, on Lehigh Valley, at North Wilkesbarre, Pa., an engine standing on a side track, but fouling the main line, was run into by a passenger train, and the passenger engine fell down a bank; engineman and fireman injured.

24th, at Milldale, Ky., collision between switching freight trains of the Louisville & Nashville and the Chesapeake & Ohio. One of the engines was overturned and the engineman and fireman were fatally injured.

25th, 1 a. m., at 82d street, Chicago, collision between a southbound freight train of the Chicago & Western Indiana and a freight of the Chicago & Eastern Illinois which was drawn by two engines. Three engines and 10 freight cars were wrecked and one engineman was injured. There was a blinding snowstorm at the time.

And 7 others on 7 roads, involving 3 passenger and 10 freight and other trains.

DERAILMENTS.

Defects of Road.

27th, on Pennsylvania road, at Glen Loch, Pa., a freight train was derailed and nine carloads of live stock were wrecked. The fireman was killed. It is said that the derailment was due to a defective switch.

And 3 others on 3 roads, involving 3 freight trains.

Defects of Equipment.

1st, on West Jersey & Seashore, at Woolferts, N. J., a freight train was derailed by a broken axle and six cars were ditched. A brakeman was injured.

4th, on New York, New Haven & Hartford, at Cannon, Conn., a southbound express train of three cars was derailed by the breaking of an axle of the tender, while running at full speed, and the body of the smoking car fell to the rails.

11th, on Baltimore & Lehigh, near Laurel Brook, Md., a passenger train was derailed by the breakage of a truck of the baggage car, and the cars fell down a bank. Two passengers and the engineman were injured.

12th, on Pennsylvania road, near Wayne, Pa., a freight train was derailed by a broken truck and seven cars were wrecked. A brakeman was killed and the conductor was injured.

17th, on Chicago, Rock Island & Pacific, near Volland, Kan., passenger train No. 3 was derailed by a broken flange and the tender, baggage car and smoking car fell down a bank. The derailed cars took fire and the baggage car, mail car and three passenger cars were burned up. Three mail clerks and 20 passengers were injured, none severely.

17th, on Chattanooga Southern, near Bronco, Ga., a mixed train was derailed by the breaking of a truck wheel of the locomotive, the engine being overturned. The fireman was killed and the engineman and one brakeman were injured.

19th, on Western New York & Pennsylvania, near Sonyea, N. Y., a freight train was derailed by a brakebeam which was broken and fell on the track, and a brakeman was faltally injured.

22d, on Erie road, at Rittman, O., westbound passenger train No. 5 was derailed by the breaking of a parellel rod and the engine and baggage car were ditched. The engineman, fireman and five passengers were injured. It is said that the train was running very fast and that the engine and first three cars were completely wrecked.

And 10 others on 10 roads, involving 1 passenger train and 9 freight trains.

Negligence in Operating.

7th, 9 p. m., on Pennsylvania road, at Lovett, Pa., a freight train became uncontrollable on a steep descending grade and the whole train, an engine and 25 cars of coal, was derailed, except the front truck of the engine. One trainman was killed and three were badly injured. The train ran about 6 miles at high speed and one of the trainmen fell off some time before the derailment. The cars left the track at a sharp curve and 14 of them fell down a bank. The engine remained upright and the engineman and fireman were not injured.

30th, 3 a. m., on Denver & Rio Grande, near Texas Creek, Col., a passenger train was derailed at a point where the track had been weakened by a flood, and the engine fell down a bank. The engineman was killed. It is said that the engineman probably forgot a slow order which had been given to him.

30th, on Pennsylvania road, at Glen Loch, Pa., a freight train approaching the junction of the Trenton Cutoff and the Phoenixville Branch was derailed at a derailing switch and the engine and sevevar empty freight cars were damaged. A passenger train was approaching on the other track.

And 2 others, involving 2 freight trains.

Unforeseen Obtsructions.

5th, 7 a. m., on Pennsylvania road, at Ardenheim, Pa., a westbound freight, a westbound fast passenger train and an eastbound freight were derailed and wrecked, nearly at the same moment and in the order named, by a landslide in a cut. Three locomotives and 12 freight cars were wrecked. One engineman and one fireman were killed and a baggageman and an express messenger were injured. The engine and eight cars of the westbound freight appear to have been first derailed and to have been pushed over upon the passenger track. The wreck took fire and the bodies of the men killed were badly burned. The express car was damaged by fire.

15th, 1 a. m., on Pennsylvania road, near Selingsgrove Junction, Pa., express train No. 9 was derailed by a landslide and the engine and all the cars but one were badly damaged. The train was running at good speed, but it is said that only one person, the baggageman, was injured. The landslide occurred just as the train reached the point, a rock crashing through the window of the cab of the locomotive.

17th, 2 a. m., on Louisville & Nashville, near Wheeler, Ky., a freight train was derailed by a landslide; fireman killed, engineman injured.

19th, on Southern Pacific, near Clipper Gap., Cal., a freight train was derailed by a horse, and the foremost of the two engines drawing the train was ditched. The engineman and fireman were fatally scalded and another trainman was injured.

19th, on Pennsylvania road, near Bailey, Pa., a passenger train was derailed by a landslide and one brakeman was injured.

20th, on Lake Shore & Michigan Southern, near West Seneca, N. Y., an eastbound passenger train was derailed by ice in a switch and the engine, baggage car and one passenger car fell into the ditch. The engineman was killed and the baggageman and one brakeman were injured.

31st, 1 a. m., on Louisville & Nashville, near Grand Bay, Ala., passenger train No. 2 was derailed at a washout, and the baggageman was injured.

And 3 others on 3 roads, involving 1 passenger train and 2 freight trains.

Unexplained.

2d, on Mobile & Ohio, near Tupelo, Miss., a train carrying several hundred men lately mustered out of the army, was derailed, and six passenger cars were overturned. Two soldiers were killed and six others injured.

17th, On Detroit & Mackinac, near Onway, Mich., a train consisting of a snowplow and two locomotives was derailed and fell down a bank. The engines were wrecked and one engineman was injured.

19th, on Pennsylvania road, near Newport, Pa., a freight train was derailed and the conductor was injured.

21st, on New York Central & Hudson River, at Prospect, N. Y., a passenger train was derailed and two trainmen were injured.

23d, on South Carolina & Georgia, at Augusta, Ga., a passenger train was derailed and one passenger car was overturned. One passenger and one trainman were injured.

28th, on Kansas City, St. Joseph & Council Bluffs, at East Leavenworth, Mo., a passenger train was derailed and three passengers and one brakeman were injured.

29th, on Southern Pacific, near Auburn, Cal., a freight train was derailed and the conductor and one brakeman were injured.

30th, on Kansas City, St. Joseph & Council Bluffs, near Parkville, Mo., passenger train No. 20 was derailed and the whole train, except the engine, fell down a bank. The cars took fire and several sacks of mail were destroyed. One trainman and 17 passengers were injured.

And 10 others on 9 roads, involving 2 passenger and 8 freight and other trains.

OTHER ACCIDENTS.

13th, on Illinois Central, near Coldwater, Miss., the dining car of a passenger train was badly damaged by a fire which started in the kitchen.

26th, on Philadelphia & Reading, near Mohrsville, Pa., a locomotive of a freight train was wrecked by the explosion of its boiler. A brakeman was killed and the engineman and fireman were injured, the latter faltally.

And 1 other, involving 1 passenger train.

A summary will be found in another column.

The Canals of New York.

The Committee on Canals of New York State, which consists of Gen. Francis V. Greene, George E. Green, John N. Scatcherd, Major Thomas W. Symons, Frank S. Witherbee, State Engineer E. A. Bond, Superintendent of Public Works Partridge and John A. Fairlie, Secretary, has sent to fifty men, who are informed on the canals and their management, a letter giving the views of the committee, and asking for expressions of opinion in return. The letter is, in part, as follows:

The Governor of New York requested this committee to report to him before the next meeting of the Legislature what is best to be done about the canals. Briefly, the facts in the case are as follows:

From 1817 to the end of 1882, when the tolls on the canals were abolished, the State had paid out for construction and enlargement of the canals the sum of $78,685,580, and for superintendence and ordinary repairs the sum of $48,399,286, and had received in tolls and other revenues the sum of $135,418,325, leaving a net balance of income over outgo of $8,333,457. The profit on the Erie canal at that time was more than $42,000,000 over and above the cost of construction and maintenance, in addition to the indisputable benefits in the past to the commerce and prosperity of the State of New York. . . . The tonnage on the canals has steadily diminished from 6,673,370 tons in 1872 to 3,360,063 tons in 1898. . . .

In 1895 the Legislature authorized, and the people by vote approved, the expenditure of $9,900,000 for increasing the depth from seven to nine feet in the canal-bed, and eight feet in the masonry structures. The appropriation is exhausted, and the work is stopped. The commission appointed last year has reported that 36 per cent. of the work is completed, and 64 per cent. is yet to be done, and that to complete this project, including suitable modern locks at Cohoes, Little Falls, Newark and Lockport, will cost approximately $15,000,000. . . . It seems to us that there are five possible solutions of the problem:

(1.) To complete the present project of enlarging the Erie, Oswego and Champlain Canals, at a further cost of $15,000,000 (or $24,000,000 in all). The benefits to be derived from this project are estimated by competent engineers at a saving of 1.11 cents per bushel of wheat from Buffalo to New York, or a reduction from the present cost of 1.8 mill per ton per mile, to 1.0 mill per ton per mile, and a corresponding reduction in other traffic, on its capacity of about 15,000,000 tons per annum. It is understood that this present project includes the construction of pneumatic locks at Lockport and Cohoes, the lengthening of all other locks on the Erie and Oswego canals, so as to take in two canal boats, each 115 feet in length, and these two canals made suitable for boats of a draught of eight feet.

(2.) To enlarge the present locks on the Erie Canal at once to a length of 260 feet, a width of 26 feet and a depth of 11 feet, making them suitable for boats 25 feet wide, 125 feet long and 10 feet draught. This project would cost about $6,000,000. . . . It is estimated that the use of such boats would result in a saving of 1 7/10 cents per bushel of wheat, or a reduction to 1 mill per ton mile. With the locks thus enlarged the question of increasing the size of the prism could be considered separately with the following results:

(a.) With the size of the canal prism increased so as to complete the existing project, making it suitable for boats of eight feet draught, and of the length and width above stated; these would have a capacity of about 620 tons or 20,667 bushels of wheat, instead of 240 tons, or about 8,000 bushels of wheat, as at present. . . . (b.) With the size of the canal prism increased so as to make it suitable for boats of 10 feet draught and of the length and width above stated; these would have a capacity of about 820 tons, or 27,333 bushels of wheat, instead of 240 tons, or 8,000 bushels of wheat, as at present. The cost is estimated at $24,000,000.

(3.) To construct a barge canal continuously descending all the way to the Hudson River from Lake Erie, with a depth of 12 feet, and suitable for barges of 1,200 to 1,500 tons, which can be towed on the lakes, if desired. The cost of this is approximately estimated at $50,000,000, and the saving at 1.55 cents per bushel of wheat from Buffalo to New York, or a reduction over present cost of 1.8 mills per ton per mile to 0.6 of a mill per ton mile. Its capacity is estimated at 25,000,000 tons per annum.

(4.) To construct a ship canal, with a depth of 20 to 30 feet, suitable for lake and ocean vessels of 5,000 to 10,000 tons capacity. The cost of such a ship canal, depending upon its size and the route adopted, is estimated at from $200,000,000 to $500,000,000. This ship canal project is under consideration by the Federal Government, Congress having appropriated $240,000 for surveys, and authorized the appointment of a deep waterway commission, which is now vigorously prosecuting surveys along the Oswego-Mohawk and the Champlain routes, with a view to forming an accurate estimate of the cost.

(5.) To abandon the canals entirely, as has been done in some other states, and dispose of the property interests therein to private individuals or corporations on the best terms which can be secured, or to make some other use of the property for the benefit of the State.

The Long Island Terminal Tunnel.

In our last week's issue in connection with an account of the Long Island Railroad improvements some details were given of the proposed tunnel between Flatbush avenue, Brooklyn, and Cortlandt street, New York City. For one cause or another the difficulties in getting necessary rights and franchises have, up to now, made it impossible to undertake the work. The railroad company has wished to secure a perpetual franchise. At last a bill limiting the term of the franchise to 50 years with the privilege of a 25-year extension was passed and the Governor announced before the bill came up for a final hearing that he would sign it with the time limit as amended.

This tunnel will be undertaken in connection with the work of the Atlantic Avenue Commission in Brooklyn, of which Mr. Eugene Blackford is Chairman. The estimated cost of this latter work is $1,500,000, half of which is paid for by the railroad company and the other half by New York City. The estimated cost of the tunnel is $6,000,000, which will be carried out as a private enterprise. The tunnel and the Atlantic avenue improvement are so intimately associated that it will be impossible to go on with the former until all obstacles are removed from proceeding with the latter. But now unless something quite unexpected occurs there is no reason why the work should not be taken up in earnest.

Altogether, this is one of the most important moves in the solution of a much vexed problem which has been made for a long time. It seems unnecessary to remind the reader of the incomplete passenger fa-

cilities between the lower part of New York and the rapidly growing suburbs of Brooklyn and all Long Island.

If the new plans are carried out the time from New York to City Hall, Brooklyn, will be six minutes, to Flatbush avenue eight minutes, to Nostrand avenue 11, East New York 16, Woodhaven 24, and Jamaica 30. At present it takes at least 25 minutes to go from Flatbush avenue, Brooklyn, to Cortlandt street, near Greenwich, where one of the proposed lifts will be built. The immediate result of such a decrease in time from Woodhaven, Jamaica and other points on the island will be apparent. The ultimate development of the scheme will be carrying the suburban traffic of the Long Island Railroad right into the business center of New York at high speed and, finally, perhaps, with an unbroken journey.

Another Railroad Supply Combination.

It would seem that some railroad officers have caught the spirit of combination and are organizing a consolidation of railroad supply interests to be known as the American Railway Equipment Co. The scheme is being promoted under the direction of Mr. Robert Mather, General Attorney of the Chicago, Rock Island & Pacific, for which purpose room 613 in the Monadnock Block, Chicago, has been taken. But at present this is a rather barren-looking place for a company with an authorized capital of $22,000,000, and is occupied only by a few mysterious law clerks.

As usual the organization is incorporated under the laws of New Jersey, and there will be $10,000,000 of 7 per cent. cumulative preferred stock and $12,000,000 of common stock. It is proposed to issue enough of this stock to enable the new company to take over the business in the following specialities, estimated to have a value of about $6,300,000; it is reported that options have also been secured on various other devices and that the list may be increased.

Brake Beams.—Chicago Railway Equipment Co.,

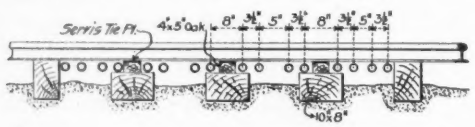


Fig. 8.—Arrangement of Sleepers to Accommodate Leadout.

Chicago (lessee National Hollow Brake Beam Co.); American Brake Beam Co., Chicago; Kewanee Mfg. Co., Jersey City, N. J.; Sterlingworth Railway Supply Co., Easton, Pa.; Monarch Brake Beam Co., Limited, Detroit, Mich.

Brakeshoes, cast steel trucks and bolsters and steel castings.—The Sargent Co., Chicago (licensee American Brake Shoe Co.); Shickle, Harrison & Howard Iron Co., St. Louis, Mo.

Pressed steel trucks and bolsters.—Cloud Steel Truck Co., Chicago; Standard Car Truck Co., Chicago; Simplex Railway Appliance Co., Chicago; Common Sense Bolster Co., Chicago.

Car roofs.—Chicago-Cleveland Car Roofing Co., Chicago and Cleveland, O.; C. B. Hutchins & Sons, Detroit, Mich.; P. H. Murphy Mfg. Co., East St. Louis, Ill.

Car doors and grain doors.—National Railway Specialty Co., Chicago; the Q & C Co. (car door business only), Chicago; McGuire Mfg. Co., Chicago (grain door business only).

Journal boxes.—McCord & Co. (journal box only), Chicago.

The only line which the new concern will practically control is that of brake beams, as in the others there will still be plenty of competition. A prospectus has been sent to numbers of railroad men in which it is shown that beside paying dividends on the preferred stock, the new company will be able to pay over 6 per cent. on the common stock. It is hoped to place a good deal of this stock with railroad men, probably because it will be such a good investment, and possibly it is hoped in this way to overcome any prejudice there might be to buying of a "trust" and to hold the former business of the individual companies. Of the 18 companies named above only eight have plants of any description, and most of these are merely small assembling shops. It would therefore seem that the new concern is getting very little tangible property, but is buying principally patent rights and good will; things which just now appear to be highly valuable as a basis for a big issue of stock.

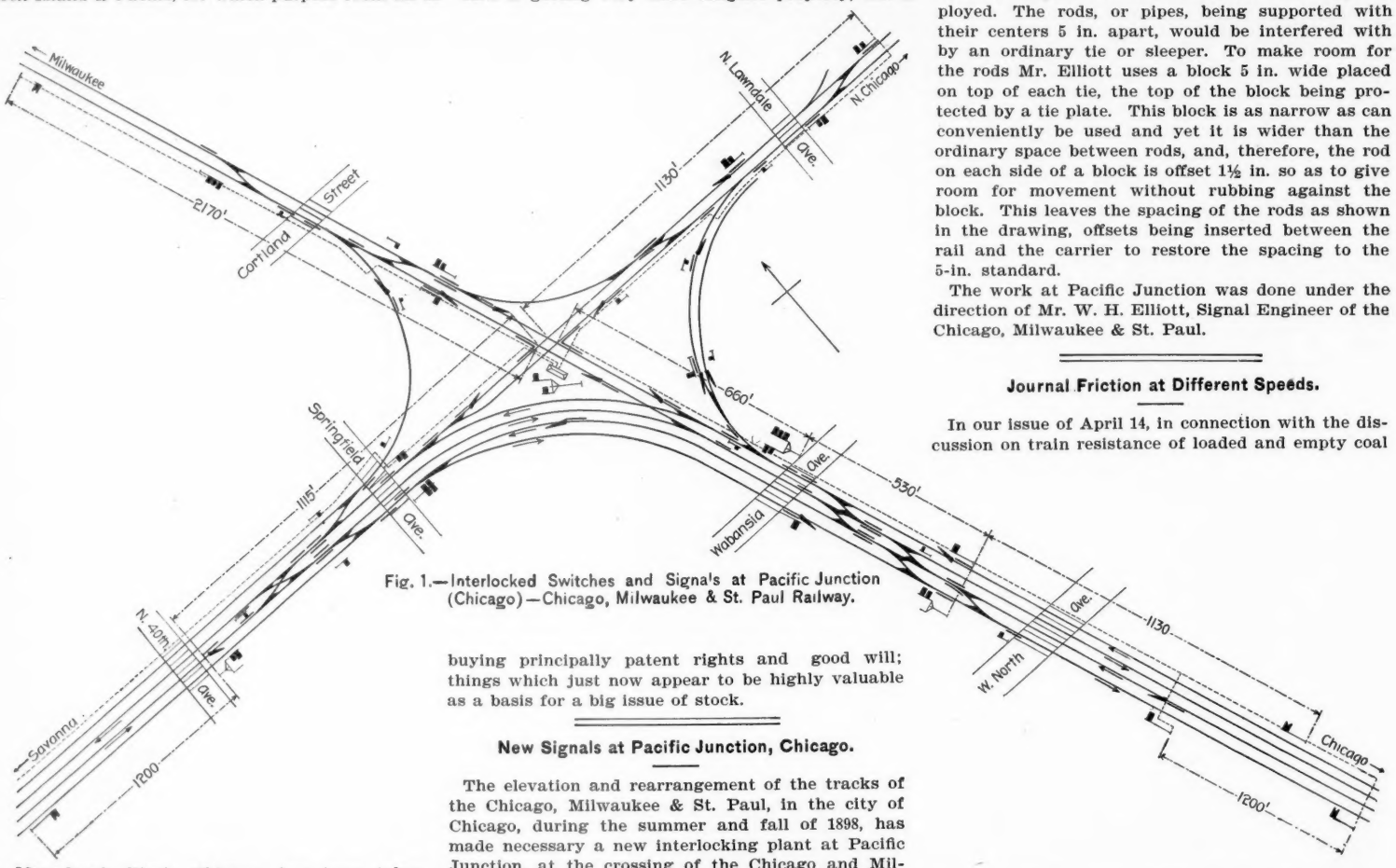


Fig. 1.—Interlocked Switches and Signals at Pacific Junction (Chicago)—Chicago, Milwaukee & St. Paul Railway.

New Signals at Pacific Junction, Chicago.

The elevation and rearrangement of the tracks of the Chicago, Milwaukee & St. Paul, in the city of Chicago, during the summer and fall of 1898, has made necessary a new interlocking plant at Pacific Junction, at the crossing of the Chicago and Milwaukee division and the Chicago and Council Bluffs division. The work was done by the Union Switch & Signal Co., and the signals were put in service on March 20. The former interlocking, replaced by the new plant, has been in service since 1891. The tower is situated between North Lawndale Avenue and Springfield Avenue, Chicago, and contains a 108-lever machine made up as follows: 19 levers for 32 switches, 9 levers for 11 derails, 2 levers for 4 crossing bars; 6 levers for 6 switches, 6 derails and 1 dwarf signal; 1 lever for 1 high and 1 dwarf signal; 17 levers for 32 facing point locks; 17 levers for 17 dwarf signals, and 31 levers for 36 signals. There are 6 spare spaces.

The tracks governed by the interlocking are shown by the accompanying plan, Fig. 1. These tracks are now being relaid with new 82 lb. rails. The distant signals are wire connected, while all other signals and the switches are connected to the machine by pipes. The pipe carrier foundations are concrete, with oak tops. The signal posts are of metal, like those illustrated and fully described in our issue of September 2, 1898, page 626. The metal posts corresponding to the usual 10x10 in. wooden post, are made of three sections of round pipe, respectively 4 in., 5 in. and 6 in. in diameter, with swaged joints. The bracket posts are built up of angles which form the corners, and are laced together. Both kinds of posts are set in concrete, are very rigid and present a good appearance. The half-tone engraving (Fig. 2) shows one of the bracket posts, and also how the pipe lines are carried across bridges. Arms, built of angle iron and carrying an oak top plank, are riveted to the outer stiffeners of the bridge girders and support the pipes. This is shown in Fig. 7. With this arrangement the alignment of the pipes is easily maintained at the bridges. To preserve the alignment where pipe lines are carried diagonally beneath tracks, Mr. Elliott uses the subway shown by the accompanying sketches (Figs. 3 and 4). A platform of 8 in. x 16 in. timbers is first laid at right angles to the pipe line on a good bedding of gravel. On this four 8 in., 20½ lb. steel I beams are spiked parallel to the pipe lines, and the ties of he track

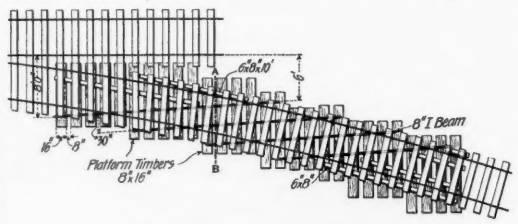


Fig. 3.—Subway for Pipe Lines.

are bolted to these beams. The pipes and wires are thus run straight between the I beams, and beneath the track as shown.

In Fig. 8 is shown an arrangement for supporting the rails of the track opposite the tower where the leadout rods pass under, which has been adopted to avoid the expensive I-beam construction usually employed. The rods, or pipes, being supported with their centers 5 in. apart, would be interfered with by an ordinary tie or sleeper. To make room for the rods Mr. Elliott uses a block 5 in. wide placed on top of each tie, the top of the block being protected by a tie plate. This block is as narrow as can conveniently be used and yet it is wider than the ordinary space between rods, and, therefore, the rod on each side of a block is offset 1½ in. so as to give room for movement without rubbing against the block. This leaves the spacing of the rods as shown in the drawing, offsets being inserted between the rail and the carrier to restore the spacing to the 5-in. standard.

The work at Pacific Junction was done under the direction of Mr. W. H. Elliott, Signal Engineer of the Chicago, Milwaukee & St. Paul.

Journal Friction at Different Speeds.

In our issue of April 14, in connection with the discussion on train resistance of loaded and empty coal cars, was given a table showing the results of tests for journal friction at different speeds. Inasmuch as none of the actual thermometer readings were given, it is possible that Table 2, page 262, may confuse some readers. As would be observed by studying this table only relative readings were inserted. To make the matter clear the accompanying table giving the actual values for 100 revolutions has been prepared, from which the actual figures at readings other than 100 revolutions per minute can be easily computed if desired.

In making out the tables of comparisons under various conditions, it is quite common to take one set of conditions as unity, in which the actual figures are given and then followed by a column by

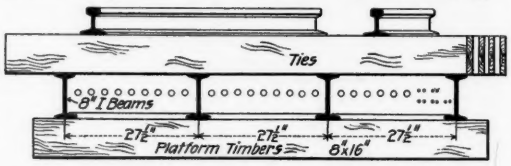


Fig. 4.—Sect on on Line A B of Fig. 3.

which each of the actual conditions is taken as unity and the figures are compared with these, given in percentage, either higher or lower than unity.

In this case the average temperature of the journal at 100 revolutions per minute was taken as unity, from which naturally, the starting temperature at the same speed would be less than unity. Similarly the average journal friction at 100 revolutions per minute was taken as unity and compared with the maximum journal friction at starting, at 10 minutes after starting and stop.

In the same way the dynamometer horse power

and the average of 100 revolutions was taken as unity and comparisons made with it.

For the tests at 100 revolutions alone the comparisons are made vertically; for the tests at 100, 200, 300 and 600 revolutions, the comparison is made horizontally, the actual condition in the 100 revolution test being taken as unity and the others, percentage higher or lower. Thus 89° Fahrenheit is taken as the unity of the condition at starting and the others based on it. The average condition at 110°

Tests for Journal Friction at Different Speeds. Results at 100 Revolutions per Minute Being the Basis.

	Comparative Vertically. Average the Basis.		Comparative Horizontally.			
Revolutions per Min.	100		100	200	300	600
Temperature of journal:	Degr. F.	%	%	%	%	%
Maximum (at start)	89	81	100	92	99	88
Average	110	100	100	108	121	147
Minimum (at stop)..	117	106	100	110	123	144
Journal friction, 16½ in arm.:	Lbs.	%	%	%	%	%
Maximum (at start)	6.13	191	100	110	130	163
10 min. after start ..	4.43	138	100	99	82	79
Average	3.21	100	100	95	84	69
Minimum (at stop)..	2.76	86	100	94	82	73
Dynamometer H.P.:	H.P.	%	%	%	%	%
Maximum (at start)	?	?	100	?	?	?
10 min. after start..	.116	138	100	197	246	474
Average	.084	100	100	190	251	413
Minimum (at stop)..	.072	86	100	89	246	436

shown for the 100 revolutions is taken as unity and the others compared with it.

It should be remembered that the results were tabulated in this form simply to confirm the statements on journal friction, made in the previous article referred to above. For another purpose they might be given in another form to better advantage.

The Impression of a Motive Power Man in a Trip Abroad.*

By R. H. Soule.

During the period from October to June, 1898, the writer made a trip to South Africa and Russia in the interest of the Baldwin Locomotive Works, and incidentally observed those features of railroad practice which would naturally be of interest to a motive power man. The following is a brief record of some of those observations.

South Africa.

There are four railroad systems in South Africa: The Cape Government Railways, the Natal Government Railways, the Government Railways of the Orange Free State and the Netherlands South African Railway; the latter operating all the lines in the South African Republic, more commonly known as the Transvaal. The first three are government railroads, the last is a private corporation sustained by Dutch capital and managed from Amsterdam. The Orange Free State Railways were built, and for a time operated by the Cape Government, but have since been taken over by the Orange Free State.

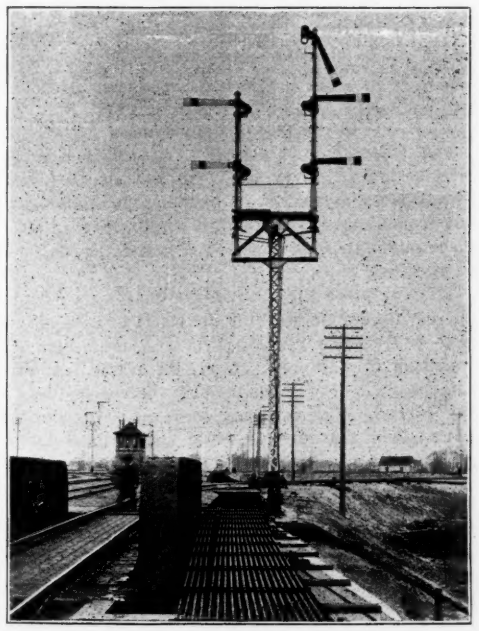


Fig. 2.—Bracket-Post Signals—Pacific Junction Interlocking.

The administration of the Netherlands South African Railways is Dutch, while that of the other three systems is English. All the railroads throughout South Africa have a gage of 3 ft. 6 in. Many of the operating officers of those railroads are already of the opinion that this was a mistake, and that a gage of 4 ft. 8½ in. should have been adopted.

There are about 1,000 locomotives running in South Africa. Perhaps 750 of these are of English and Scotch build, and about 250 of German and French build. Some additional locomotives are now being built in Amsterdam. Practically all of these 1,000 engines have outside cylinders, but this is not so much due to preference as to the fact of the 3 ft. 6 in. gage. The screw reversing gear and the English vacuum brake are in general use. All the engines throughout the country have good cabs, these being necessary to protect the crew from the fierce heat of the sun. Outside valve gear is popular, that of the Walschaert type being preferred, the Joy gear, however, being quite unknown.

The locomotives of the Natal Government Railways, as well as those of the Orange Free State are more distinctly English in their general appearance, but the Locomotive Superintendent of the Cape Government Railways, though born and brought up in England and Scotland, seems quite free from the effects of local influences, and to have the faculty of picking out points and details of good practice wherever observed and grafting them on his own designs. It is for this reason that some distinctively

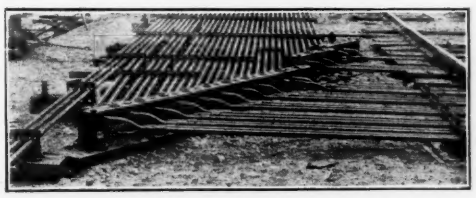


Fig. 5.—A Nest of Cranks.

American details may be observed in the locomotive practice of the Cape Government Railways. The locomotives of the Netherlands South African Railway are generally German in their appearance. The Cape Government engines usually have regular tenders, but in Natal and the Transvaal, where the grades are heavy and the lines crooked, tank engines are largely used, even in road service.

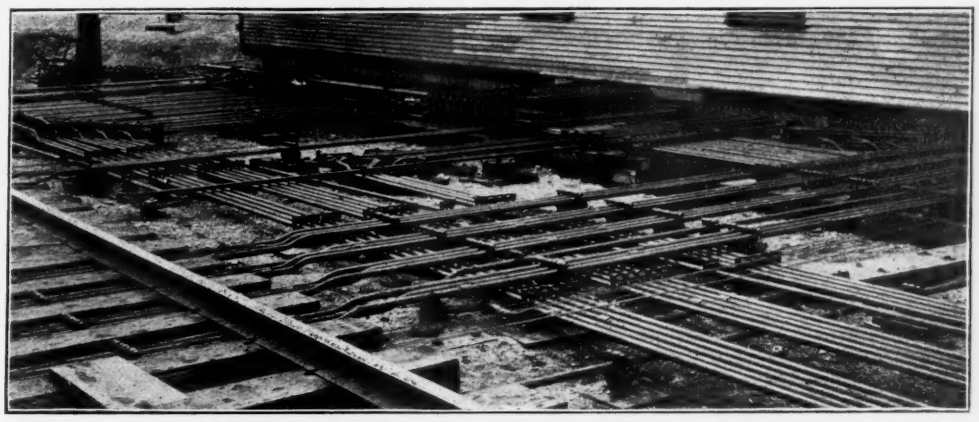
Passenger equipment cars are usually on the English plan with compartments, although there is a tendency as in England to introduce a passage-way along one side, thus making what are known as "corridor cars." In South Africa, as in England, however, long passenger equipment cars, with two four-wheeled trucks, are preferred to the old short-bodied cars with six wheels working in pedestals attached directly to the car body. On the Netherlands South African Railway, in the Transvaal, they have a great many German built passenger equipment cars having end platforms and doors, upper works built entirely of sheet metal, but with the interior arranged with corridor and compartments.

Freight equipment cars are of English and German types entirely, with no variations, which are peculiar to South African practice.

The shop facilities of the South African roads are a surprise in one respect, as they are much better than one would expect to find, in such far away places; the tool equipment, originally English and German, in recent years, has been added to by modern tools selected from the markets of the world, including America. Being so far from the base of supplies, however, the South African shops are naturally lacking in those many little labor-saving devices and conveniences which are peculiar to our home shops. Moreover, local conditions in South Africa, more particularly government control, have never imposed on operating officers the critical duty of such close economy as has been required on most American roads in recent years. This necessity, however irksome, has resulted in our being able to lead the world in economical railroad operation, shop management included. No locomotives or passenger equipment cars have ever been built in South Africa, and a first lot of freight equipment cars were being built at Durban, Natal, in December, 1897.

The organization of the motive power departments of the different South African Railways is quite similar to that of our American roads, but the titles of the officers are different. The officers of the mechanical departments are first class men, and South Africa seems to have been able to take her pick of home talent from England, Holland and Germany.

The train service on the South African Railways is good in a few respects and indifferent in other respects. For instance the local passenger service out of Cape Town is first class, both in frequency and speed of trains, but the through service strikes us as poor. Once a week, following the arrival of the mail boat from England, a special train faster than any other makes the run from Cape Town to Johannesberg. The distance is about 1,000 miles and the time fifty hours. This gives an average speed, including



—Leadout—Pacific Junction Interlocking.

stops, of twenty miles an hour; this results from long stops at stations, much delay on account of meeting and passing other trains on single track ("crossing trains" they call it) and slow work in mounting grades, the latter trouble believed to be largely due to insufficient boiler capacity. South African freight trains are short and appear to be made up with a view to quick trips rather than with the object of hauling maximum loads at a minimum cost, as with us.

Russia.

There are perhaps a dozen or fifteen different railroad systems in Russia; about two-thirds are operated by the Government and about one-third by private corporations. The gage is uniformly 5 ft. 0 in.; it is said that this gage was adopted for strategic and protective reasons and to render impossible a rail invasion from Germany, where a gage of 4 ft. 8½ in. is used. The result is the enforced transfer of all passengers and freight on the border between Germany and Russia.

There are between 8,000 and 9,000 locomotives in Russia. Of these perhaps 1,000 are of American build, the balance are German, French and English, and, in more recent years, Russian; the combined capacity of the seven or eight Russian locomotive works being about 1,000 locomotives a year. Although the 5 ft. 0 in. gage gives plenty of room between frames, yet nearly all the locomotives running in Russia have both outside cylinders and outside valve motion. The severe winter weather in Russia makes it a particularly disagreeable task to get under an engine, and the influence of the engine crews has been a large factor in determining the prevalent practice of both outside cylinders and outside valve motion. The Joy form of valve gear is in general use on Government locomotives, but the Walschaert form seems to

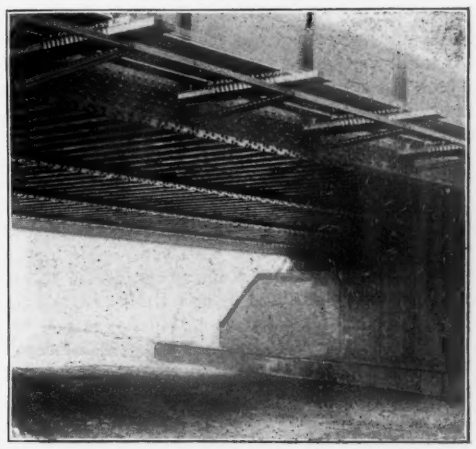


Fig. 7 —Support for Connections on Girder Bridge.

be preferred on the private lines. All Russian locomotives have closed cabs, as a protection against severe winter weather. All locomotives are by law equipped with hand rails on the outer edges of running boards as a measure of safety for the crew. Coal, wood and oil are all used as locomotive fuels in Russia; in general, coal is used in the West, wood in the Northeast and oil in the Southeast. The English vacuum brake has heretofore been in general use, but is now being displaced by the Westinghouse

(*Continued on page 339.*)

*Written as a paper for the Texas Railway Club.

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EDITORIAL ANNOUNCEMENTS.

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The Compound Locomotive for Very Fast Service.

We lately published some extracts from that valuable document on the compound locomotive, the paper by Mr. Herr and the discussion thereon before the Western Railway Club. A good many points were suggested in that paper and in the discussion which may profitably be developed at much greater length. One of these is the special fitness of the compound locomotive for very fast service.

In the course of Mr. Herr's discussion he speaks of the advantage which the compound engine has in its greater power for the same weight on the drivers and the same cylinder power. This comes from the fact that the compound uses steam more economically at the instant when it is taxed to the utmost, and so has a greater ultimate horse-power capacity. "The compound engine using steam more economically enables the fireman to shovel more horse-power into that engine than he could shovel into a simple engine." This, of course, has a direct bearing on the power of the compound to reach and sustain very high speeds, although the general economy may be said to be greatest when the work is hardest and most constant and the speed moderate.

In Mr. Barr's discussion he said that he was almost prepared to take the position that the compound "is the very best engine for fast runs, better than it is for slow runs." This opinion is based in general on the fact that for a certain horse-power the compound evaporates from 15 to 20 per cent. less water and burns a correspondingly less amount of fuel. In addition to this, however, Mr. Barr says that with the four-cylinder compound, in which the guides and crossheads "seem to play such an important part," these special difficulties diminish as the speed increases. He is inclined to think that in very fast running this kind of trouble with the four-cylinder engine will be very little increased over what may be experienced with the simple engine. He says: "I do not know of any reason for the assertion that is made, and made until we all feel like believing it, that the compound engine is not very well adapted to a fast service."

Mr. Soule says that some of the most successful achievements of the four-cylinder compound engine have been in fast and heavy passenger service. He points out what seem to him some special reasons why it should be superior in this way to the two-cylinder compound, at any rate. One reason is that it is perfectly balanced, as between its two sides, "which is not true of the two-cylinder compound." Furthermore, he has been told that one difficulty in getting very high speed out of a two-cylinder compound is "the complication of the intercepting valve. The back pressure runs up very rapidly in the high pressure cylinder."

As the discussion proceeded Mr. Herr said that the compound is advantageous in heavy passenger service, and especially so in the very fast service, because in that service the boiler is taxed the hardest and the greatest amount of horse-power is required.

Naturally, it will not be admitted without discussion that the four-cylinder compound engine has any theoretical or practical advantage over the two-cylinder engine for fast passenger service, although we all admit the advantage of any compound engine over a simple engine in the capacity to develop power when worked up to its limits. As to the inequality of power and balance on the two sides of the two-cylinder compound, the men who build that type of compound, and who have had experience with it (and a good many men have had very favorable experience with it) will tell us that this is a mere talking point, and that the power on the two sides may be easily equalized by proper ratio of cylinders and valve adjustment. Furthermore, it is easy to exaggerate in the mind the practical effect of this inequality. Some of the earlier two-cylinder compounds were decidedly defective in this respect, but the inequality of power on the two sides would not have been known except by indicating the engines.

Mr. Soule does not speak with much assurance about the intercepting valve trouble. He says that he "is told" that one of the difficulties in running a two-cylinder compound at high speed is the complication of the intercepting valve. Surely this is not a universal difficulty or a necessary one. There is no trouble in getting ample and straight passages through the intercepting valve. They could easily be made larger in any of the two-cylinder compounds if that seemed desirable.

We cannot see any reason why a two-cylinder compound locomotive should not run as fast as a four-cylinder compound. The primary qualification, namely, the capacity to develop relatively great power with relatively small weight is there, as well as in the four-cylinder type. In boiler power, size of cylinders and valve adjustment one could hardly have an advantage over the other, while we could easily imagine that for very fast work the two-cylinder compounds have the advantage of simplicity and lightness of reciprocating parts.

In fact, in this club discussion the matter of the weight of the reciprocating parts of the four-cylinder engine was passed very lightly. Mr. Vaughn, who had ridden at about 80 miles an hour on the Reading single drivers, said that they had one great objection for fast work in their "excessive overbalance or counterbalance, and that there is about 700 or 800 lbs. over and above the rotating weight to counterbalance to make them run steadily." Of course, we are all pretty familiar with the fact that the finest, sustained, very high speed records that have been made anywhere have been by four-cylinder compounds on the Atlantic City run, and those splendid engines deserve all the praise and admiration that they have received. Up to this moment they represent the climax of achievement in sustained speed. Still, we do not know that anybody claims that they have done their work so well as they have simply because they are four-cylinder compound locomotives or because they are compounded at all. They have Wootten fire-boxes, with which a large exhaust nozzle can be used, and they have thus a special advantage for high speeds. This would be particularly true for compound working, as a small exhaust nozzle would badly handicap a compound engine in high speed work. It will be remembered that the experiments made by Mr. Smart at Purdue were without an exhaust nozzle, the release to the atmosphere being through an open pipe, a fact which diminishes the value of those tests for comparison with the tests of the simple engine installed in that same laboratory.

On the whole, giving full weight to the fine achievements of the compound engine in fast passenger work, we are not yet prepared to admit that it has shown much advantage over equally well designed simple engines of the same weight for fast passenger service, and both the two-cylinder and the four-cylinder will have some disadvantage in counterbalance effect on the track, and in this respect the four-cylinder will be at the greatest disadvantage.

All of this has been written with regard to the one point of the possible advantage of the compound engine for extremely fast service. For pasenger service in general, Mr. Herr, who certainly has had excellent opportunities to study the subject, thinks that "we should be a little cautious as to how the compound is used in passenger service, because generally the engines are not worked in passenger service beyond the most economical point of cutoff for the simple engine, and work pretty light on the down grades." In his judgment the ideal service for the compound is on level divisions, in freight service. On a light passenger run the compound, for several reasons, loses some of its advantages.

The Supreme Court on Mileage Tickets.

The decision of the Supreme Court of the United States on the Michigan mileage ticket law, reported on another page, has aroused considerable interest outside of Michigan. The vigorous language in which Judge Peckham describes the discrimination involved in granting reduced rates to a passenger who buys 1,000 miles in advance, but who travels at odd times, just the same as any transient passenger, suggests the query whether such discrimination is not contrary to public policy at all times and in all places; and the question is being asked. The Court confines itself, of course, to the question whether it is right for a State to compel a railroad to thus discriminate, and easily reaches the conclusion that it is not; but by reading between the lines a little, one may very plausibly conclude that the Court finds no principles to justify a railroad in voluntarily discriminating thus in favor of one class of passengers, even though the State is forbidden to compel the discrimination. The Springfield Republican has used this decision as a club with which to give the Massachusetts Railroad Commissioners a few whacks for having, in their annual report last January, justified the sale of reduced-rate tickets in the suburban district around Boston, because the plan was based on the "wholesale principle." Says the Republican:

> If, then, a state law compelling the sale of such tickets imposes a pure, bald and unmixed discrimination in favor of a few persons, what is to be said of the voluntary acts of the railroads in the same direction? Are their mileage books which have been issued voluntarily at reduced rates any the less an unreasonable and indefensible discrimination? Evidently not, and when the state permits this discrimination the state is denying to persons the equal protection of the laws as much as when the state compels it. This decision would appear to be a blow direct at the whole application of wholesale and retail principle in the sale of transportation service to individuals who do not use the service in bulk.

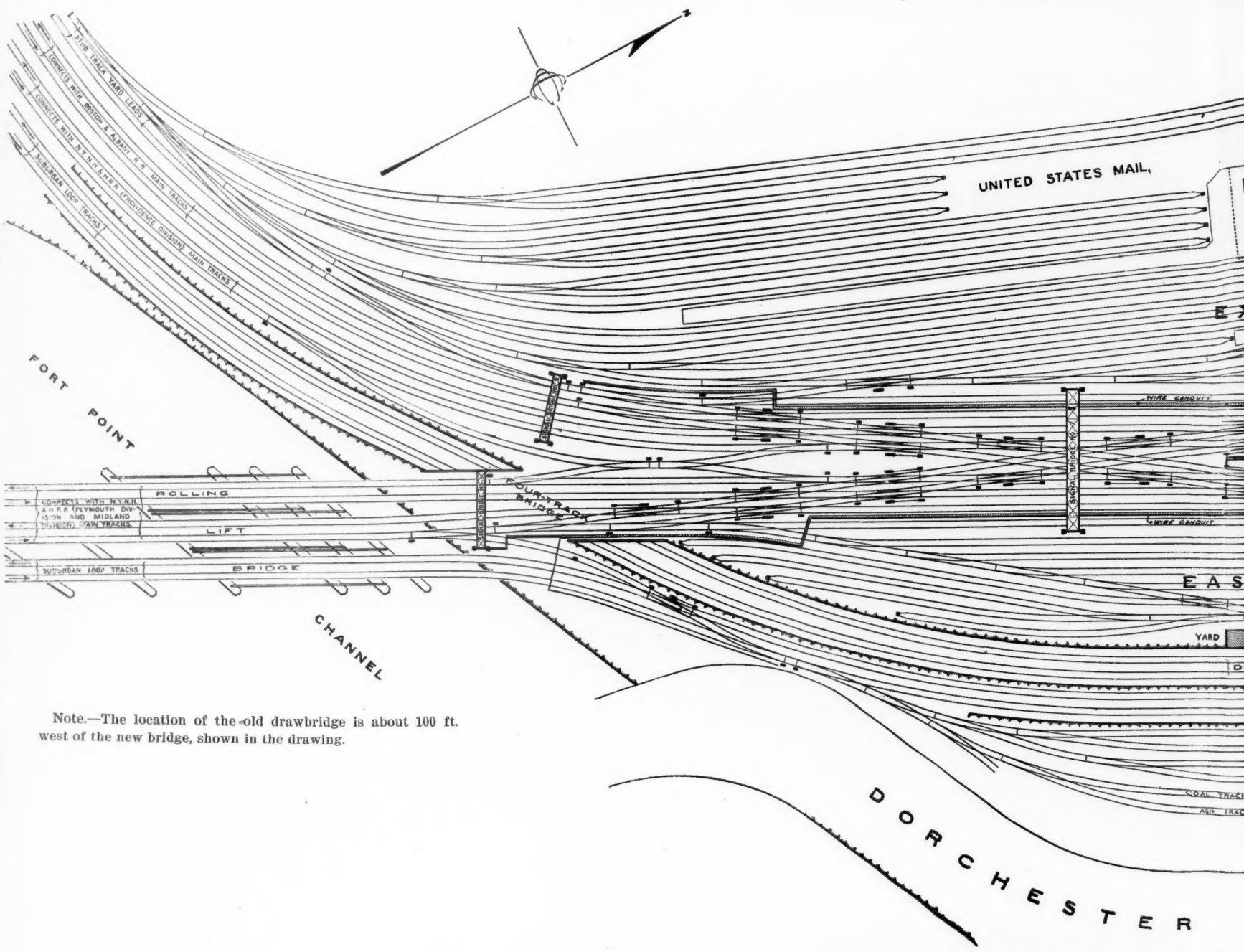
The utterance of the Massachusetts Commissioners, which the Republican criticises, refers to the commutation tickets used by the thousands of people who go to and from Boston every day. These tickets, unlike those in use in other parts of the country, are good for a considerable time beyond the period in which they will ordinarily be used and are freely transferable. Thus a purchaser can use the ticket for his family as well as for himself, and the price is nearly as low as that of the monthly and quarterly tickets formerly used. The Commissioners said:

> The discrimination in favor of the suburban district is based, as we understand—and we know of no other ground on which it can be justified—on the universal law of trade that dealers in large quantities are entitled to better prices than dealers in small quantities. The suburban district is a large purchaser of passenger transportation. The railroad company can therefore afford and is bound to allow reasonably lower rates, whether to the transient customer who buys a single ticket, to the occasional customer who buys a ticket for five or ten rides, or to the daily and wholesale customer who buys a ticket for 50 to 100 rides—graduating the rate in general to the amount of the purchase.

The Republican practically agrees to the discrimination in favor of West Newton, ten miles from Boston, as against its own city, 100 miles away, but argues that the buyer of a single ticket at either place ought to receive as low a rate as the buyer of 50 or 100.

To clearly see the grounds for making a discount on the different classes of tickets it is necessary to note the precise difference in the conditions surrounding the different classes of traffic. A party rate ticket is clearly justified by the reduced cost to the carrier. The ordinary fares are based on the assumption that one or more trains must be run regularly every day, and that on all ordinary occasions the company must be prepared to furnish seats to all applicants without previous notice. This results in hauling a large proportion of empty seats every day. Probably the average capacity of the American passenger train is from 150 to 300, while the average load, as computed by the Interstate Commerce Commission, is less than 50. Now to fill these empty seats, or to get an extra car-load (which extra car usually involves but a very small extra expense) the carrier can well afford to make a substantial reduction. Fifty or 75 per cent. is often taken off, to the benefit of the passenger and the profit of the railroad. The question for the railroad is, what rate will produce the largest net receipts?

An excursion rate aims to fill whole cars and whole trains, and the experience of many railroads during the past ten years seems to justify very great reductions for such business. A reduction for a theatrical party of 25 or a baseball "nine" of a dozen is justified not only by the reduced cost per capita



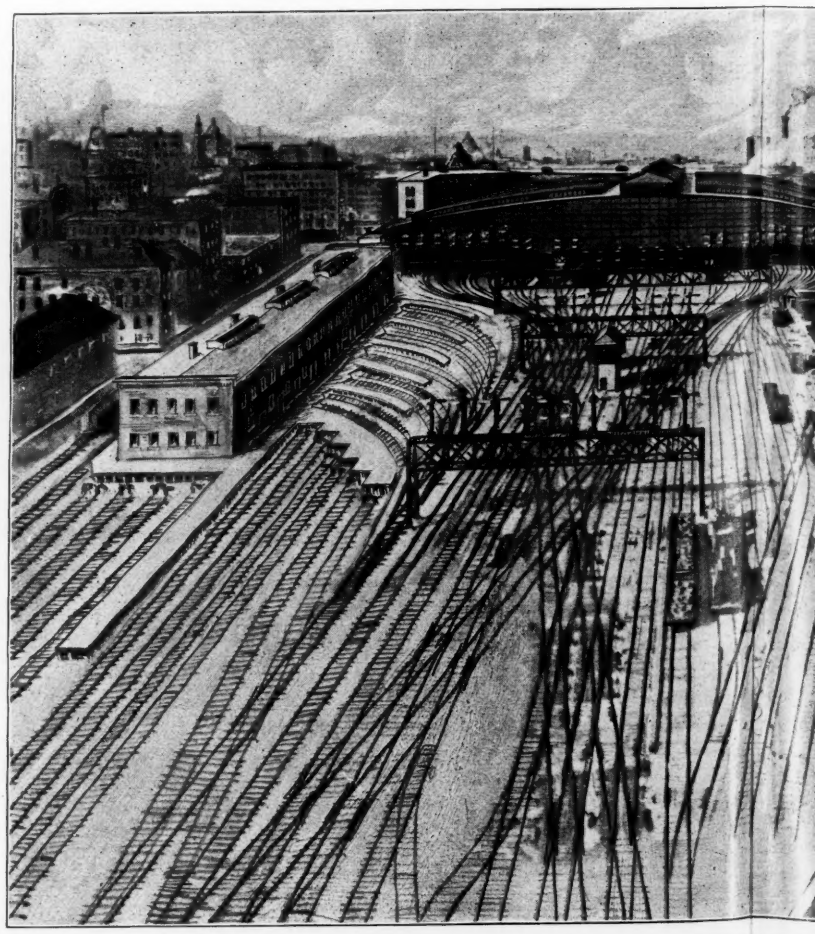
Note.—The location of the old drawbridge is about 100 ft. west of the new bridge, shown in the drawing.

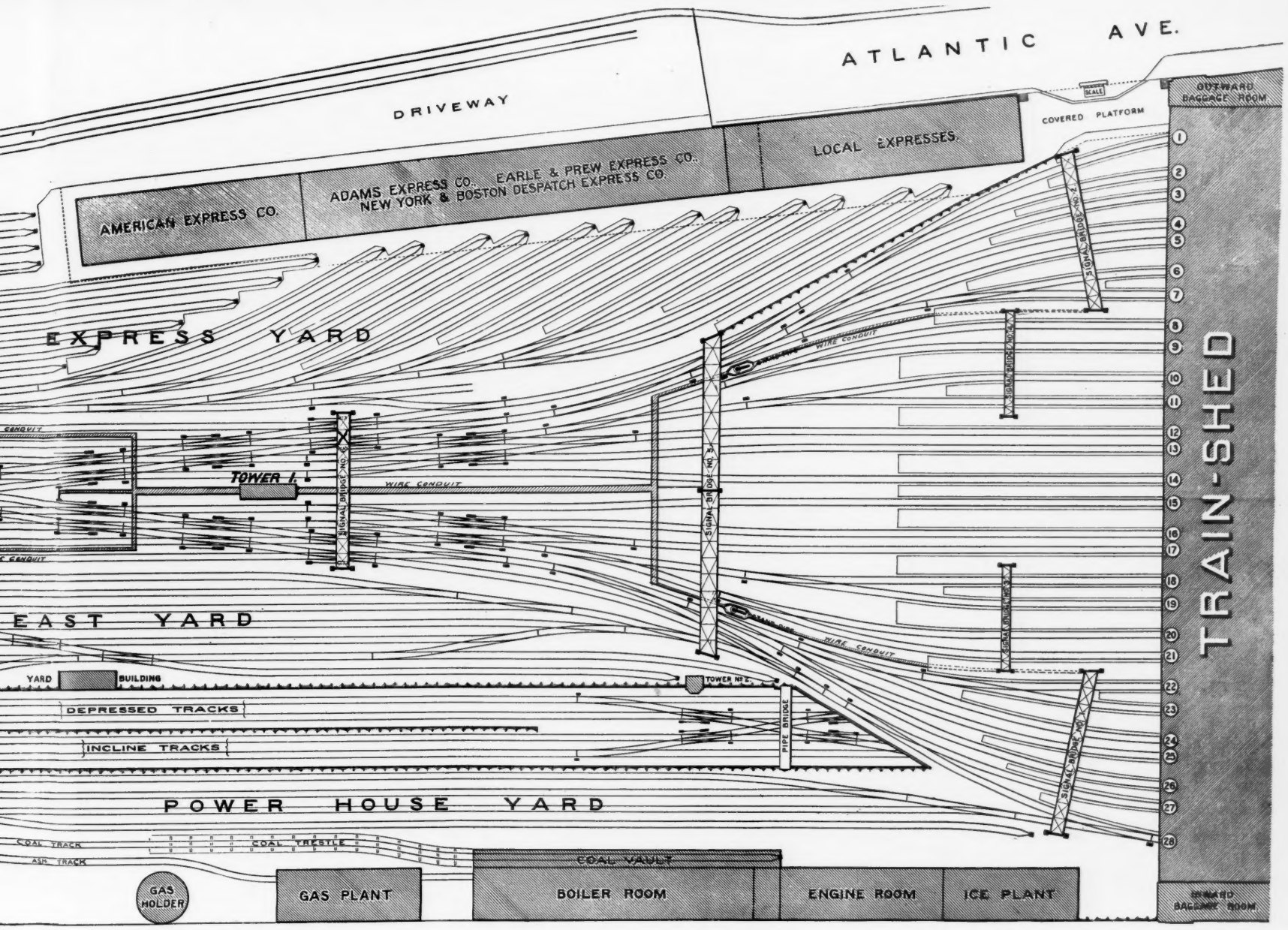
DIAGRAM AND BIRD'S-EYE VIEW OF THE YARD OF THE SOUTH STATION, BOSTON.
THE BOSTON TERMINAL COMPANY.

Accompanying article on Switches and Signals, by J. P. Coleman.

This station will be used by two railroads, the New York, New Haven & Hartford and the Boston & Albany. The trains of six lines are to run into the station, not to mention the subdivisions of the Plymouth division. These six are, beginning on the north:

1. Boston & Albany.
2. Northern Division N. Y., N. H. & H., formerly Old Colony, using B. & A. from South Framingham.
3. Woonsocket or Pascoag line of Midland Division N. Y., N. H. & H., formerly New England R. R., using B. & A. from Newton (Cook Street).
4. Providence Division, N. Y., N. H. & H., formerly Providence Division, Old Colony.
5. Midland Division, N. Y., N. H. & H., formerly New England R. R.
6. Plymouth Division, N. Y., N. H. & H., formerly Old Colony, main line.





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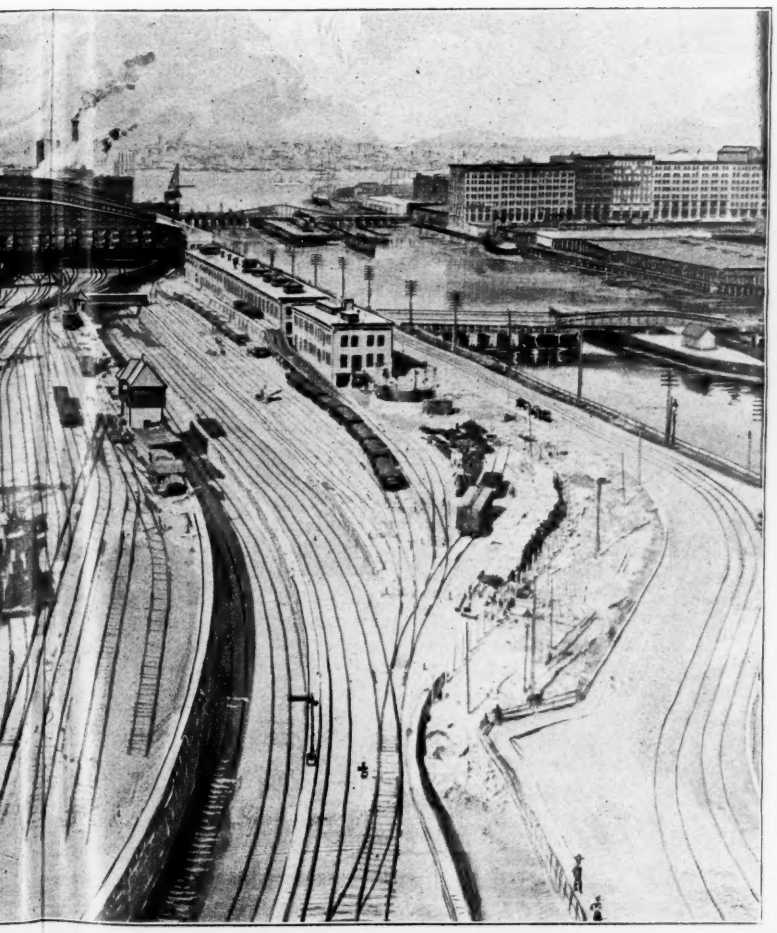
A V E N U E



BOSTON TERMINAL STATION, 1899.

Area of ground	35 acres
Length of train shed	602 ft.
Width of train shed	570 ft.
Extreme height of train shed	112 ft.
Extreme length of power buildings	569 ft.
Length of yard from south end of train-shed to signal bridge No. 8, near drawbridge	1,430 ft.
Length of track in train shed and yard	15 miles
Length of track under roof	4 miles
Weight of rails in track	2,500 tons
Number of double slip switches	37
Number of switches	252
Number of frogs	283
Number of semaphore signals	148
Number of levers in interlocking machine (Tower No. 1)	143
Capacity of tracks in train shed, main floor (65 ft. cars)	282
Capacity of express and mail tracks (cars at platform)	38

This station was described in the Railroad Gazette of—
1897, Jan. 1, Jan. 8 and July 9.
1898, May 6 (waterproofing).
1899, Jan. 6 (general description) and Jan. 13.

The interlocking will be described in a future issue.

where a number of persons can be counted on in advance for a particular train, but also on the ground that the reduction induces these classes to travel more than they would at full rates. If their aggregate payments to the railroad can be permanently increased, while leaving the aggregate expenditures of the road no larger, or not so much increased as is the income, the company can afford to make a reduction not only in its own interest, but also in the interest of the public, for thus it will the sooner be able to make a reduction on all of its rates.

Mileage tickets, as a general thing, are justified only by this last consideration. If the passenger will travel more in the aggregate than he would at the full transient rate, the interest of the road dictates that a reduction be offered him to induce him to do so. And if low rates in general are a benefit to the community, the railroad may justify granting reductions to the well-to-do people who can afford to buy $20 tickets, on the ground that this is the best way to popularize railroad travel. The people who cannot raise $20 in advance will be influenced by the example of their richer neighbors, as well as by simple reductions in rates.

But, the principle of the mileage ticket being admitted, the question arises, how many miles should be the limit? Why should the buyer of 2,000 miles receive any lower rate than the man who buys 500? It is said that if a man's wife has a mileage or family ticket in her purse she will make shopping excursions oftener than if she had to pay cash each time she boarded the cars; but we have never seen any very definite evidence on this point; and if the advocates of a general reduction on single-trip tickets should claim that the feminine mind was influenced 95 per cent. by the reduction in price and only 5 per cent. by the sight of the ticket, it would probably be hard to controvert the claim. If anything like this percentage represents the real proportion, it follows that a road could make nearly as much money by a reduction on single tickets, well-advertised, as by reducing to 1,000-mile buyers only.

A small class of people ride only when necessity compels them to do so. These the railroad naturally desires to make pay the highest rate. From a purely commercial standpoint it is undoubtedly fair for it to do so. But in view of the strong motives impelling the legislator to favor the "masses" and of the constant reduction in the numbers of this class of travelers, in consequence of the improvement in the social condition of people generally, and the increase of the desire for luxuries—all railroad travel is a luxury, even ten-mile rides—it seems at least doubtful whether a railroad can make anything by withholding its lowest single-ride rate (single-ride business includes practically all of that on mileage tickets) from any class of passengers.

There is another argument in favor of low price single-trip tickets which the public and legislators care nothing about, but which should have weight with a railroad manager; the argument that single trip tickets can be so managed as to offer much less temptation to conductors to steal. The argument in favor of mileage tickets, that they reduce the cost of selling tickets and afford the passenger a valuable convenience, probably amounts to very little as compared with the question of rates.

The very low rates granted to suburban passengers who travel every day constitute a third class. As intimated in the argument already quoted from, a suburban "commuter" has the advantage of two grounds on which to ask a reduction; he makes many journeys himself and he always has a crowd to join with him. The railroad is bound to make a low rate to train loads presenting themselves every day at the same hour, for the simple reason that the cost is very much less than for the ordinary passenger. No one passenger can demand the adoption of the wholesale principle, and yet the principle applies. The passengers involuntarily combine into car loads or train loads, and economy will force a low rate sooner or later. The railroad cannot refuse to make a low rate for ten miles out of Boston; and it probably has no desire to do so, for the low rate stimulates travel. But, on the other hand, the profitableness of low rates near a large city affords no warrant for making the same rates to and from places 100 miles away.

As the increasing volume of business coming to a railroad justifies new reductions, the railroad is bound to proceed consistently. To reduce fares rapidly, when by a slower reduction, temporarily taxing the people more heavily, the service could be improved or safety enhanced, might be neglect of the true interest of the public. If Massachusetts railroads are to spend millions on the abolition of grade crossings, and also reduce fares, ordinary caution would dictate that both moves should not be made on the same day. The money to buy 50 or 100 new passenger cars may have to be saved up through the slow accretions of a year or more. If, before the cars are bought, a crowd of millionaires going to a football game rushes in upon the road so suddenly as to more than fill all available cars, probably most business men would say that on that day fares ought to be raised, rather than reduced, though the cost of the service would be much less than the average.

A road doing business in a large territory, say three to six different States, has to constantly keep in mind the demands of the people of different sections. The granting of a just reduction in one State may lead to a demand, which cannot be withstood, for a similar reduction in another State, where it would not be just. As long as a railroad's money is all kept in one treasurer's pocket this will be inevitable; but it justifies obstinacy sometimes. In the State of Maine the legislature has just decreed that after one year a partly-used mileage ticket must be redeemed at the full rate. Thus if a man buys 1,000 miles at 2½ cents (where the single-ticket rate is 3 cents) and uses 500 miles, he may get a rebate of $12.50 after 12 months, and thus has got a reduction in his ride of $2.50, with a loss of say 50 cents interest on his unproductive investment; net profit, $2. Michigan is not the only State where the legislators sit up nights to devise schemes for making miserable the life of the railroad traffic manager.

March Accidents.

Our record of train accidents in March, given in this number, includes 47 collisions, 55 derailments and 3 other accidents, a total of 105 accidents, in which 36 persons were killed and 144 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS.	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	9	0	0	9
Misplaced switch	0	1	1	2
Failure to give or observe signal	1	3	2	6
Mistake in giving or understanding orders	0	4	0	4
Miscellaneous	8	1	4	13
Unexplained	3	3	7	13
Total	21	12	14	47

DERAILMENTS.			
Broken rail	1	Careless running	1
Loose or spread rail	1	Derailing switch	1
Defective switch	1	Runaway train	1
Defective frog	1	Bad loading	1
Broken wheel	5	Animals on track	1
Broken axle	6	Landslide	6
Broken truck	3	Ice	1
Fallen brakebeam	1	Washout	2
Broken parallel rod	1	Unexplained	18
Broken air-hose	1		55
Broken car	1		
Misplaced switch	1		

OTHER ACCIDENTS.	
Boiler explosion	1
Broken side rod	1
Cars burned while running	1
	3
Total number of accidents	105

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Total.	P. c.
Defects of road	0	4	0	4	4
Defects of equipment	9	18	2	29	28
Negligence in operating	25	5	1	31	29
Unforeseen obstructions	0	10	0	10	10
Unexplained	13	18	0	31	29
Total	47	55	3	105	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accid's.	Total.
Passenger	19	19	2	40
Freight and other	67	38	1	106
Total	86	57	3	146

The casualties may be divided as follows:

Killed.	Collisions.	Derailments.	Other accid's.	Total.
Employees	17	12	2	31
Passengers	1	2	0	3
Others	2	0	0	2
Total	20	14	2	36
Injured.				
Employees	40	31	1	72
Passengers	14	54	0	68
Others	4	0	0	4
Total	58	85	1	144

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	0	0	1	0
Defects of equipment	0	27	5	11
Negligence in operating	1	14	19	43
Unforeseen obstructions and maliciousness	0	0	6	9
Unexplained	2	27	0	9
Total	3	68	31	72

Twenty-two accidents caused the death of one or more persons each, and 30 caused injury but not death, leaving 53 (50 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with March of the previous five years shows:

	1899.	1898.	1897.	1896.	1895.	1894.
Collisions	47	66	49	57	36	40
Derailments	55	98	71	72	81	68
Other accidents	3	8	3	5	9	4
Total accidents	105	172	123	134	126	112
Employees killed	31	15	32	18	21	17
Others killed	5	4	8	10	2	5
Employees injured	72	92	47	49	61	63
Others injured	72	36	39	46	19	23
Passenger trains involved	40	45	41	37	36	38
Average per day:						
Accidents	3.39	5.55	3.97	4.32	4.06	3.61
Killed	1.16	0.61	0.29	0.90	0.74	0.71
Injured	4.65	4.13	2.77	3.06	2.58	2.67
Average per accident:						
Killed	0.34	0.11	0.33	0.21	0.18	0.19
Injured	1.37	0.74	0.70	0.71	0.63	0.76

The number of casualties to passengers reported in March is not large, but there were a number of notable train accidents. Perhaps the most notable passenger train accident, from the superintendent's standpoint, was the rear collision at Allegrippus, Pa., on the 9th. This collision is the third case which we have recently had to report of a passenger train collision where the absolute block system was in force, the other two being Colonia, N. J., Dec. 3 and Gallagherville, Pa., Feb. 13. Another collision in the present record which was characterized by somewhat unusual conditions, was that at Ada, W. Va., on the 19th. A third collision worthy of note was that at Jersey City, N. J., on the 3d.

The worst passenger train derailment in March was that at Volland, Kan., on the 17th. In the derailment at Ardenheim, Pa., on the 5th we have the very unusual combination of three trains being derailed simultaneously by a single landslide. One of the most disastrous accidents of the month, from a financial point of view, was that at Lovett, Pa., on the 7th.

We note but one very serious train accident in Canada; on the Manitoba & Northwestern, March 7, about 2 a. m., the locomotive of a passenger train was wrecked by the explosion of its boiler near Millwood and the engineman and fireman were instantly killed.

We have accounts of only three street car accidents in the United States in March. One of these was a derailment on a bridge at Millbury, Mass., and the car fell into the river. There were only four persons in the car at the time and it was reported that the cause of the derailment would probably never be discovered, as the conductor, motorman and another motorman riding dead-head, were all killed. The single passenger was badly injured. At Chicago, on the 9th, a car was run into an open draw. It stopped on the abutment, but not until it had run so near the brink that the motorman jumped into the river to save himself. Four passengers were injured by jumping off.

Annual Reports.

Michigan Central.—The annual report of the Michigan Central Railroad for the year ending Dec. 31, 1898, is received. The gross earnings amounted to $14,046,149, being an increase of $349,000 over 1897. This increase was entirely in freight, the passenger earnings having shown a decrease of $143,000. This falling off is due to a less number of passenger miles, the decrease in passengers moved one mile having been 9,899,567; the total movement was 144,505,752 passenger miles. This decrease was in the through travel. The local passenger movement actually increased nearly three million passenger miles, but the through fell off almost 13 million passenger miles, or 36 per cent. At the same time the average rate per passenger per mile increased from 2.175 cents to 2.225. Considering the trolley competition, we should have supposed that the local business would have declined rather than the through business. As it is, the cause of the change is left to conjecture.

The freight movement showed a gain of 131,552,000 ton-miles and the total movement was 1,665,158,000 ton-miles. The rate fell off from 0.616 cent to 0.597.

The operating expenses and taxes were $10,546,000, and the increase over the preceding year was $296,000. The net earnings were $3,500,000. After paying fixed charges there was a net revenue of $4.40 per share, out of which a four per cent. dividend was paid, and $70,000 was set apart for building a second track between Ypsilanti and Dexter, leaving a balance of $4,734. The cost of all betterments and additions to property, excepting this $70,000 and a further item of $14,438, was charged to operating expenses. The item of maintenance of way and structures increased somewhat over the preceding year, while the item of maintenance of equipment decreased; but in neither case was the change important.

A reporter for the Minneapolis Journal has succeeded in condensing the whole philosophy of the long and short haul law into a single paragraph. It is the report of a hearing before the Minnesota State Railroad Commissioners, which may be found in our traffic column to-day, and to anybody who wants to know what a law of this kind means, is well worth reading. The Northern Pacific, to reach Duluth from Minneapolis, goes first northwestward to

St. Cloud, 65 miles, then swings to the east and runs 62 miles to Brainerd, and then runs eastward 119 miles to Duluth; total, 246 miles. The St. Paul & Duluth, on the other hand, is only 160 miles long between Minneapolis and Duluth, and the line is practically straight. The first argument presented is that of the Northern Pacific. This road desires to carry some of the through business, because, having a track, and cars, and other facilities, it can afford to perform the service at the (reasonable) rates charged by the short line and still save some profit for itself. Way stations will continue to have as favorable rates as at present, which rates a court would, no doubt, declare prima facie reasonable; and the intermediate shippers might enjoy some benefit from the presence of the through business on their line. So much for the first argument. Next comes the short line, which, of course, would feel bound to cut under any new rate made by the long line. This would be necessary in order to retain its share of the business, which share, according to the view of the officers of the St. Paul & Duluth is, of course, 100 per cent. If it shall become necessary to make a severe reduction to thus prevent an upstart competitor from taking away legitimate business, why should not the law permit this to be done without touching the rates to or from intermediate places, where the new competitor cannot come in to force an unnatural reduction? Who can show any flaw in this reasoning? As the third argument we have the demand of the people of St. Cloud. They will never tolerate the presence in their city of cars which are enjoying a benefit which St. Cloud cannot enjoy. One might argue all day to the effect that the Northern Pacific would not be harming the people of St. Cloud; but, still, the unpleasant sight would offend their eyes every day. Probably the merchants of St. Cloud would be equally offended, when riding in the passenger cars of the Northern Pacific, if they knew that in the next seat were a couple of theatrical passengers who had received 25 per cent. discount on their tickets; but this form of discrimination has not yet become so odious as the other. We suspect that the St. Cloud argument will sooner or later prevail. The Railroad Commissioners may forsee the demoralizing cutting of rates which is likely to follow any change in the present status, and therefore refuse to authorize any such change; but if the irritation continues we may be sure that, sooner or later, the Legislature will make the long and short haul law more rigid, rather than less so, if the mercantile portion of the different communities in the State continue to make their opinions known. One can hardly blame the Commissioners for taking the matter "under advisement." The advising process will probably have to be continued a good while before it will be possible to devise a compromise which will be accepted by all concerned.

The Quartermaster of the Army at New York on May 6 opened bids for transportation of troops as follows:

	To Ogden.	To San Fr'isco.
Del., Lack. & W.	$51.45	$53.95
"	44.20	46.20
"	43.75	45.75
"	39.95	41.95
" for 100 or more	.....	38.40
Lehigh Valley	51.45	53.95
"	44.20	46.20
" 100 or more	36.40	38.40

The Baltimore & Ohio, the West Shore, the New York Central, the Chesapeake & Ohio and the Pennsylvania each put in a bid which, according to the newspaper report, is precisely like that of the Lehigh Valley, except that the Pennsylvania's highest rate to San Francisco is $53.75. This may be a misprint. The marked uniformity in the rates would seem to indicate that the roads are inclined to maintain rates for Government service as rigidly as they are maintaining them for general traffic. In making rates for the Government the railroads are free to compete, secretly or otherwise, as the Interstate Commerce law expressly authorizes reduced rates in such cases; but the anti-trust law applies, in spirit, if not in letter, for it must be just as wicked to combine to hold up prices against the Government as against individuals. Now, as the character of these bids would seem to indicate the existence of a hellish trust to maintain stable rates, we do not see how the Attorney-General can evade the responsibility of proceeding against the roads in the courts. And, worst of all, we fear that possibly Judge Knapp, a Government official, may have put them up to it. He has been talking to the railroad presidents a good deal lately about stability of rates.

It is pleasing to note that the practice of giving preliminary notice to the public, by means of printed circulars, of coming changes in time tables, seems to be growing more common. As a considerable share of all the journeys made by passengers (except those using season tickets) are planned for several days beforehand, it should be perfectly obvious that to meet the reasonable demands of the public every change to be made on a Monday should be published everywhere by the preceding Wednesday—or Thursday at the latest; and yet nothing is more common than the issuance of tables on Saturday to go into effect within less than 48 hours thereafter. A notice recently issued by a large road says: "On Sunday next the following changes will be made in our passenger train schedules. At stations affected by the changes agents should have newspapers call attention to them as an item of news, and have newspaper time tables properly corrected. . . . " And yet this circular, so commendable in its terms, was dated Thursday, and, no doubt, reached the most distant stations on Friday, in season for use in only one morning paper before Sunday. This is a matter in which the passenger department should be particularly alert to please its customers, for it is one in which no effective complaint is likely to be made. If the subject were one which people were likely to take to the legislature, the G. P. A. who waited for the State to compel him to do well by the public might perhaps have a shadow of an excuse; but it is not such a subject.

As heretofore noted in the Railroad Gazette, the Lehigh Valley has lately given large orders for coal cars of eighty and one hundred thousand pounds capacity, 1,000 of the cars being steel, of 100,000 lbs. capacity. The company has now notified shippers that the old four-wheel coal cars will all be withdrawn from service, and that the substitution of the 40-ton and 50-ton cars for the small ones will probably be completed by July 1. As the company had on hand at the time of the last report (March) over eleven thousand four-wheelers, this notice affords a striking bit of evidence of the rapidity with which the large car, reducing the proportion of dead weight and of trainmen's wages, is forcing itself on all the large railroads as a measure of economy. The Lehigh Valley's notice would seem to indicate that dealers in scrap iron would soon have to report a glutted market.

NEW PUBLICATIONS.

The Railroads of Russia. A Review of the Railroads of Russia from the beginning until 1892. Prepared by the Eighth Section of the Imperial Technical Society of Russia.*

The two volumes of text and one of plates which bear the above title are quite worthy of the society by which they were prepared and of the purpose which they were intended to serve, namely, to present to the Fourth Session of the International Congress of Railroads, held in St. Petersburg in 1892, a complete account of the railroad systems of the Empire from their beginning until the sitting of the Congress, considered from every point of view. It would be hard to conceive of a more complete exposition of the actual state of the systems than is here presented, but the elaborate details exhaust the reader as well as the subject, unless that reader is furnished with an unlimited curiosity concerning this special topic, which as a reader for the readers of the Railroad Gazette, the writer of this review has secured.

At the date of the Congress the entire system of railroads in the Empire comprised 19,391 miles, including 1,163 miles in Finland, the Trans-Siberian line not having then been begun. When we remember that this Empire embraces one-sixth part of the solid earth upon the globe, we perceive that there is abundant room for the expansion of the system and for the employment of many contractors and engineers. Confining our comparison with other countries to Russia in Europe, which is the most populous portion of the Empire and the seat of all the railroad systems existing in 1892, we find that to equal France, Germany, Holland and Switzerland in railroad facilities it will be necessary to multiply the existing mileage by fourteen; or, to equal the Kingdom of Belgium by thirty. The density of population of Russia in Europe is far below that of any other European state; but the facilities for an equal number of inhabitants are fewer in Russia than in any civilized state. Thus, Russia in Europe, with Finland, contains 96,000,000 of inhabitans, of whom each 10,000 is accommodated by two miles of railroad; the same number in France have about six miles, in Sweden ten miles, in Belgium a little more than five miles; but it is to be remembered that in some districts of this empire, as in the province of Arkangel, there is not quite one inhabitant per square mile, and of all the population of Russia, 87 per cent. are agricultural.

Another consideration which must have hindered the extension of railroads in this country is the reign of winter, which is almost coextensive with that of the Czar. On the ordinary lines they report boursouflures (heaving from frost), amounting to 12 in., and on the Oural route, to 28 in. in height. Of course, there is great trouble from snow, but in parts also from drifting sand, which, as on the Trans-Caspian line, along the dunes, are often obstructed by deposits from 60 to 90 ft. in height formed in a single day. The most successful mode of contending with either snow drifts or sand drifts has been by plantations of several rows of larches or evergreens parallel with and on both sides of the road. At the date of this report an experiment was to be tried with an American rotary plough, and it is mentioned that the cost of grading on a recently built road had been reduced one-half by the use of the New Era grader, also from America.

In the chapter on stations we are told that the distance between any two rarely exceeds 17 miles, and this, with previously stated facts, indicates that railroading in Russia must be a rather melancholy business.

The roads are built with an eye to the severest economy; they are modeled upon the experience of more advanced countries, and until lately all their rails and all their equipment have been imported. Now, however, they have begun to manufacture all these things on a limited scale and at a higher cost than that at which they could be imported; expecting, no doubt with reason, to develop their own manufactories so that they will in some near period be able to compete with those of other lands. The equipment is very similar to that of the early English roads in exterior construction, passenger cars and freight wagons having only two or three axles; but the interior arrangements are on the American system generally, with a passage through the car, but not in the center, two passengers being seated on one side of the aisle and one on the other. There are coaches for four classes, soldiers being included in the fourth class. There are special cars shown for the medical department with others for badly wounded men. In the freight traffic special cars are built for the transport of oil, coal, milk, alcohol, all well contrived, but of the small dimensions of European equipment of early days.

The Administration of the Railroads is under the strict control and surveillance of the "Ministry of ways of communication," which rules absolutely in the whole empire, whether the roads are the property of the state or of private companies, it being the purpose of the state to absorb all private railroad companies, although it would seem that it is preferred that the lines shall be built by them rather than by the state. For instance, in 1890 the state owned 29.4 per cent. of the railroad lines; by Jan. 1, 1896, it owned 61.6 per cent. Since 1890 up to Jan. 1, 1896, there have been built 2,070 miles by the state and 3,711 by private companies, only a very limited number of associations for this purpose having been authorized.

It is really painful to an American, who has been accustomed to the free initiative allowed to individuals or corporations, who are at liberty to adopt the best according to their circumstances, subject only to their responsibility before the law, to read the thousands of restrictive regulations by which each officer or employe in Russia is hampered and controlled. A distinguished Russian once defined to the present writer the difference between his country and the United States in this respect: "In Russia you may not do anything which is not expressly permitted, while in America you may do anything which is not expressly forbidden." It is evident from these volumes that the technical staff in Russia is very perfectly educated, that its studies of each department of administration are minute in detail, that tariffs for passengers and for the several classes of freight are fixed only after elaborate calculations; but it is also evident that all progress must emanate from the initiative of the few pursons at the head of the administration and must consequently be very slow, as indeed, it has been.

One feature of the Russian system deserves mention as the best result of paternalism, viz.: The "establishments for the aid of employes," which are numerous and provide for the education of the young as well as for the succor of the injured and infirm; they would not be adaptable to our needs.

It is disappointing to close this review of those three quarto volumes without being able to indicate some features of superior merit in construction or in organization which can be reported for our own improvement, but they contain nothing of the kind; yet if an entirely complete acquaintance with the Russian railroad system is desired, it may be had by the perusal of this elaborate Aperçu.

* Aperçu des Chemins de fer Russes, depuis l'origine jusqu'en 1892. par la VIIIe. Section de la Société Impériale Technique de Russie, Bruxelles, 1897.

American Railway Association; Proceedings for eight years, 1886-1893. New York: W. F. Allen, Secretary, 24 Park Place. Price $5.

This volume of 755 pages, 8 in.x11 in., contains the exceedingly valuable discussions and committee reports which for the years named have made up the history of the General Time Convention and its successor, the American Railway Association; and also the history, so far as it can be gathered, of the earlier conventions of operating officers as far back as 1872. The work is substantially a reprint of the semi-annual pamphlets, bound together, including all of the committee reports, tables and maps; and the whole has been carefully edited by Secretary Allen. The index alone fills 18 pages of moderate sized type. To the members and others who have followed the doings of the Association from year to year, and especially those who have some or all of the reports of proceedings on file, this index will be a particularly valuable portion of the book, as it gives a large amount of information in itself. Not the least interesting feature of the volume is the guide which it furnishes to the personal history of railroad officers of former years who are now out of the service; and the index affords a means of instant refer-

ence to these items, as every prominent circumstance with which a man was connected in the doings of the Association is given in the index, under his name. Among the principal subjects which have been exhaustively reported on or discussed in the Association during the past dozen years are the standard code of train rules, demurrage on freight cars, statistics of and experiments in the use of a per diem rate for interchanged freight cars, and the State and Federal laws concerning car couplers and other safety appliances. At a number of the semi-annual meetings of the Association a principal feature was the address of President H. S. Haines, and these addresses are given in full.

The history of the years preceding 1886 is given in an appendix, the records of that time being incomplete. This part of the work contains an account of the introduction of standard time in November, 1883, including the elaborate report of Secretary Allen, who engineered this important reform.

The proceedings of the Association since 1893 are, we suppose, to be issued in a second volume at some future time.

Railroad Statistics for 1897.—The Interstate Commerce Commission has issued the Statistician's annual report of mileage, capitalization, public service and earnings of the railroads of the United States for the year ending June 30, 1897, being the tenth annual report of the Statistical Bureau of the Commission. The principal totals of this report, as published in advance by the Commission, were given in the Railroad Gazette of Sept. 2, 1898, page 630. The only statistics yet given out for the year ending June 30, 1898, are those of the preliminary report which was given in the Railroad Gazette of Jan. 30 last, page 38.

TRADE CATALOGUES.

Engineers' and Surveyors' Instruments.—Messrs. C. L. Berger & Sons, successors to Buff & Berger, No. 9 Province Court, Boston, Mass., send us a new edition of their catalogue of astronomical instruments, engineers' transits, engineers' levels, etc. The catalogue is divided into two principal parts, the first, of 118 pages, being a description of the instruments with directions how to take care of them and to adjust them. The second part, 93 pages, is an illustrated catalogue and price list of engineering, surveying and astronomical instruments. The catalogue has a good alphabetical index, and thus becomes a useful book of reference. Especial attention is asked to improvements in mining transits and to new leveling instruments, among which are a hydrographic level and a new engineers' precise level. The company have two well equipped automatic divided engines with circles two and three feet in diameter, and their adjusting apparatus for testing lenses, correcting and adjusting telescopes, etc., is very complete.

The Impression of a Motive Power Man in a Trip Abroad.

(*Continued from page 335.*)

quick-acting automatic brake on Government lines, and no doubt this change will follow on the private lines later on. Tank engines are the exception in Russia, and separate tenders the rule.

Passenger equipment cars are more English than American in their general appearance, but are nevertheless distinctively Russian. The severe climatic conditions have resulted in certain characteristic features of construction. For instance, the windows are few and small, the roofs low and flat and the ventilation meagre and insufficient. The corridor and compartment features of interior subdivision prevail; insulating materials are worked into the framing, as in the construction of our own refrigerator cars, the insulating materials being used in the one instance to keep in the heat and in the other to keep out the heat. As all passenger trains are in winter heated by steam from the locomotives, the cars are more than comfortably warm; they are generally uncomfortably warm. Passenger car construction is arranged to suit winter conditions and therefore the cars are generally uncomfortable in summer on account of their small windows, numerous partitions and insufficient circulation.

Freight cars are English and German in their general appearance; the draft gear is English. The Russians, however, make the underframes and running gear of their freight cars very substantial; this is no doubt due to the fact that the roadbed is frozen solid throughout the many winter months. An American observing Russian freight equipment cars is surprised at the universal use of the strongest steel tired wheels, the stoutest axles and the large number of cars which have steel underframes; of course, these features of construction prevail in their passenger equipment cars as well.

The shop facilities of the Russian railroads are superior to those of South Africa, but inferior to our own. The tool equipment was originally Continental, but recent years have witnessed the importation of the best and newest tools from England and America, and the Government roads at least have been liberally dealt with in these respects. There are now several manufacturing shops in Russia, where machine tools are made. A notable case is the establishment at Kharkof, in Southern Russia, where there are two grand departments; one for the production of locomotives, the other for the production of machine tools. A peculiar thing about the seven or eight establishments in Russia where locomotives are built is that not one of them is exclusively devoted to the production of locomotives, but they also produce such other varieties of output as ships, bridges, rails, projectiles, etc.

The organization of the motive power departments of the Russian railroads is, as in the case of the South African railways, generally similar to our own. In Russia, however, all questions of standards and novel constructions are passed upon by what is known as the "Engineering Council;" this is a board of some ten or twelve members, including civil as well as mechanical engineers, and a new device must be very meritorious to run the gauntlet of this body. Although this council is technically to supervise standards, approve novel constructions, etc., for the Government railroads only, yet, as a matter of fact, it dominates the practice of the private lines as well and has universal jurisdiction throughout Russia. The motive power department officers of Russia are principally educated engineers, and perhaps do not include so large a proportion of simply practical men as may be found on the South African roads.

The train service of the Russian railroads seems poor compared with that of England and the Continent; high-speed passenger trains are practically unknown, and an enormous amount of time is lost at stations. Russian passenger trains stop for refreshments about once in two hours on an average. Freight train service is much the same as in South Africa, and the day of big engines with long heavy trains has not yet arrived in Russia.

The Developement of Locomotives and Cars in Austria.

(From the Zeitung des Vereins.)

Golsdorf, the celebrated machine maker, and J. von Ow, a well-informed technical writer, show in their recently published history, the merits of the peculiar types of rolling stock produced in Austria, without forgetting to acknowledge the stimulus received from abroad, and which has often led to the construction of types for which a foreign demand has arisen. The first locomotives and cars were brought from England, and English influence made itself felt in the building of the first locomotives and cars in Austria, which was quite early in the history of railroads in that country.

The first Austrian attempt at locomotive building was the engine "Patria," for the Northern Railroad, turned out in 1840, from shops designed and erected by an English engineer, and was an exact copy of the English pattern. Far greater, however, than the influence of English practice, was that of America. The American locomotives (which became known through the purchase of the engine "Philadelphia") were simpler in their details, the outside cylinders, straight driving axles, etc., being much easier to build in the then existing shops and at that stage of their development than the inside cylinders and cranked axles of the English pattern. And so it came that the machinists of the Vienna-Raaber railroad and the establishment of Gunther, in Vienna-Neustadt, worked after American models instead of English patterns.

The building of the Semmering railroad was noteworthy in the history of the locomotive. The management, in opposition to the advocates of a cable railroad, and to those who favored atmospheric power, determined to offer a reward for the best steam locomotive. The competition required the engines to be capable of handling a train of 140 tons at a speed of 11.25 km. per hour on a grade of 1 in 40. The highest allowed steam pressure was 102 lbs. to the sq. in. The maximum wheel load was not to exceed 7 tons, and it was considered absolutely necessary that the brakes should be sufficiently powerful to stop an engine alone running with a velocity of about 30 km. per hour, in a distance of 152 meters. No detailed directions hampered the freedom of treatment of the problem from the inventive side.

Of the four locomotives which entered for the competition, the "Bavaria," from Maffei, at Munich; the "Seraing," from Seraing; "Wiener Neustadt," built by Gunther, and the "Vindobona," by Haswell, all met the requirements of the competition, but it was shown in the preliminary trials that neither of these was sufficiently perfected to be taken as a type for the Semmering locomotive.

The prize locomotive "Bavaria" had large boiler and cylinders. Sprocket wheels and chains, which united the driving wheels of the locomotive with the coupled wheels of the tender, made the whole weight available for traction. The "Seraing," of which the principle of construction was the use of two boilers and two cranks, each with two steam cylinders, was resurrected in 1869 as the "Fairlie" engine. It was unsatisfactory on account of the deficient performance of the particulalry distinctive features. The "Wiener-Neustadt" was similar to the "Seraing" in the arrangement of the wheels and cylinders, but differed from it in the substitution of a single boiler with very long tubes; it shared the fate of the "Seraing" and from the same cause. Scarcely two years later these two engines again received the attention of the construction department, appearing then as the double locomotives "Meyer" and "Mallet." The locomotive "Vindobona," which the judges put in the last place, an eight-coupled engine which showed few new principles in its construction, but which on account of its long wheel base injured the track on the curves (although the middle pair of wheels had no flanges), became a few years later the type of the mountain locomotive on the continent. Several distinct features of this engine under the name of their builder, Haswell, have made considerable progress. Riggenbach's steam brake, to-day used on all cog-wheel locomotives, and many mountain engines, had its pattern in the brakes of the "Vindobona," and the Belpaire fire box had already been used on the "Vindobona;" the Bissell truck is identical with the swivel truck of the "Vindobona" and the arrangement of the steam dome as it is now applied on almost all of the Austrian locomotives, Haswell had already tried on this engine. It can thus be seen how stimulating in locomotive development the Semmering Railroad competition has been, and how fruitful the results.

After a short interregnum of the Engerth locomotive, the "Vindobona" appears again, having been materially changed by Haswell. In its new form, which is recognizable by placing the four axles nearer together in front of the fire box, it remains the first eight-coupled locomotive, and is a pattern after which the mountain engines of most of the European countries have been designed. When the second Austrian mountain railroad, the "Brennerbahn," was built, there was no longer any doubt as to the proper locomotive to be used. A simple eight-coupled engine with a trailing tender was already a type which could be most easily constructed in Austria within the allowed limits of wheel weight.

Those for the Brenner Railroad were built after the plan worked out by the Sudbahn and had outside frames. Exceeding all the previous locomotives built in Austria, both in their performance and in the adhesive weight, this type also was introduced in other countries. The Sudbahn in 1870 in building large eight-coupled engines, abandoned inside frames, which had given considerable trouble by frequent breaking of the axles, and substituted outside frames, placing the boiler high. These locomotives refuted in a remarkable way the existing doubts as to their capabilities, by handling loads of 210 tons on a 2.5 grade, while they were found in running equal in speed to those having inside frames. Such locomotives are running to-day on the Italian mountain railroads.

In 1873 came the interest in new types of fast locomotives, since those in use at that time could not develop the required speed with the economy demanded. The following severe business depression, however, prevented development in this new direction. The railroads were obliged to abandon all new experiments in locomotive building, and the constructors to confine their efforts for the improvement of the locomotive to the perfection of details and the brake apparatus, and not until the last years of the eighth decade were improvements in the valve systems made. The choice of a locomotive for the Arlberg road, where were found grades of from 2.6% to 3.1%, and curves of which the shortest radius was 200 meters, and which, therefore, demanded specially heavy work of the locomotives, was to be determined by the result of trials of a series of different types of engines. The programme of the competition demanded a locomotive capable of hauling a train weighing 175 tons at a speed of 12 km. per hour up a grade of 2.6%. Three locomotives competed, but neither of these fulfilled the requirements, and the management therefore turned to the type already in use, with six-coupled wheels for passenger and express service, and the eight-coupled type for freight, making the parts stronger and of greater size to meet the more exacting demands of that traffic.

Recent years have brought important innovations in locomotives in Austria. Some of these are the introduction of the compound locomotive, of smoke-consuming apparatus, the construction of faster locomotives with swivel frames and the increasing use of cast steel for the single parts of locomotives. When it is remembered that the newest locomotive of the Arlberg road draws a train of 200 to 220 tons weight up a grade of 2.6% at a speed of 25 to 28 km. per hour, to do which there is required not less than 950 horse power (which is double that of the eight-coupled engines of the Sudbahn in 1870), it can well be said with Golsdorf that this careful, painstaking and ingenious work shows not the final type or the limit of development of the locomotive, but rather a new departure and the forerunner of further improvements in the coming twentieth century.

The first independent creation of the Austrian car builders was turned out from the shops of the Vienna-Gloggnitz Railroad, and was patterned after the American models with platforms. The first-class cars had seats for 56, the second-class for 64 and the third-class for 72 passengers. The first two were furnished with windows, the others with cloth screens. The first freight cars had a capacity of about eight tons each and served for the transportation of all kinds of goods, being covered when necessary with tarred canvas. These were afterwards furnished with sides and end walls, and finally led up to the manufacture of covered cars for freight purposes. There are now numerous special types of cars for carrying particular kinds of freight, which were not even thought of in the earlier days; notably among the recent developments is the convertible car, which can be adapted to different uses, the transportation of passengers or freight or for military purposes, in sharp contrast to the transportation of all kinds of freight in one type of car, as at first had to be done. Refrigerator cars have been, however, considerably used in Austria for the transportation of beer and meat, since 1867. If these are not in as extensive service as is to be desired for the provisioning of large cities, it is not the fault of the Austrian car builders, since it is now possible to obtain any thing needed in the numerous convenient and serviceable types of rolling stock which are now manufactured.

Some third-class compartments of passenger cars on the railroads of Alsace-Lorraine have been fitted with bicycle holders for four wheels in each compartment. The wheelman takes his wheel into the car with him as he would his grip, hangs it up, and takes it out himself at destination. He pays 5 cents for a wheel ticket in addition to his fare.

TECHNICAL.

Manufacturing and Business.

The J. A. Fay & Egan Company, Cincinnati, Ohio, is building a large addition to its plant, and equipping it with improved tools. The company has voluntarily increased the wages of its employees 10 per cent.

The Chicago Pneumatic Tool Company has purchased the patents formerly owned by the Consolidated Pneumatic Tool Company, now defunct. These patents include all the Keller and Wolstencroft types, and several new applications not yet taken out. These patents originally cost the Consolidated Pneumatic Tool Company about $40,000. We are advised by the Chicago Pneumatic Tool Company that in one day last week it received orders for 81 pneumatic hammers and riveters, 57 drills and 17 sundry tools, a total of 155 orders.

Bids will be received until May 17, at the office of the County Comptroller, Pittsburg, Pa., for cement to be furnished during the ensuing season. About 3,300 barrels will be required.

The Colorado & Southern contemplate laying 15 miles of new rails this year.

V. G. Bogue, C. E., has moved his office from Room 66 to Room 118, Manhattan Life Building, New York.

Hereafter the Wainwright Department of the Taunton Locomotive Mfg. Co., of Taunton, Mass., will be represented in New York City by Charles H. Paine, with offices in the Singer Building.

The Harrison Dust Guard Co., Toledo, O., has received a letter from the Goodwin Car Co. which states that an experimental journal was equipped with Harrison dust guards on one of the company's cars working in Kentucky, and that the operator reports that the journal so equipped is the only one in the train that has not run hot many times. The service is severe, clay and dirt being handled in 80,000 lb. loads, at the rate of fifty miles an hour. The Harrison Dust Guard Co. is getting out equipment for 1,000 cars of 80,000 lbs. capacity, now being built for the Lake Shore & Michigan Southern at the Michigan-Peninsular works of the American Car & Foundry Co.

The Railway Appliance Co. has been incorporated in Illinois with a capital of $10,000 to make railway appliances. The incorporators are: Otto R. Barrett, Frank H. Drury and Jules N. Raymond.

Marc W. Comstock has been appointed Assistant Secretary of the American Car & Foundry Co., with headquarters at St. Louis.

Abercrombie & Williams, Barnwell, South Carolina, want to rent twelve flat cars for 60 days.

Fred S. Ball, Montgomery, Ala., wants five or ten flat cars.

John W. Gates, President of the American Steel & Wire Co., has arrived from Europe.

New Stations and Shops.

The Canada Atlantic has closed a contract with the Canadian General Electric Co., by which the machine and car shops of the road in Ottawa will be supplied with electricity generated at the Chaudiere Falls. Two three-phase generators of 200 h. p. capacity will be installed. The power will be transmitted 3½ miles to the works by an overhead line and will be used for both lighting and power.

Among other improvements, the Colorado & Southern contemplates building during the year five new stations.

A Storage Battery Road.

A contract between the Electric Storage Battery Co. of New Jersey and the Waterloo & Cedar Falls Rapid Transit Co. of Waterloo, Iowa, for 215 cells of storage battery, was recently filed in the office of Secretary of State of Iowa. Upon the payment of $5,845 the Battery Co. agrees to furnish and install in a building prepared by the purchaser, 215 elements of the latest improved type, with a guaranteed capacity of 320 ampere hours when discharged at the eight-hour rate, and 160 ampere hours when discharged at the 1 hour rate. The battery company is also to furnish and install the necessary switchboard.

Air Power Cars in New York City.

At last accounts the Metropolitan Street Railway Company was running half a dozen of the Hoadley & Knight compressed air cars on Twenty-third street. These were being run to break in men and were not carrying passengers, although it was expected that by the middle of this week regular passenger business would be done by the air cars. The track in Twenty-eighth and Twenty-ninth streets is not being relaid, as the newspapers have said, but curves are being eased and some solid special work is being put in at some of the curves and junction points. These tracks will finally be laid with heavier rails, but not necessarily at present. As we pointed out in an editorial article last week, this whole matter is one of great importance for the public service of the people of New York City, but it is one which must be advanced slowly in order that no mistakes shall be made. Just now the only apparent cause for delay is the necessity for having men with a little special training.

The prepartions for running the street railroads of Rome, N. Y., with compressed air motors seem to be going on well, and there also will soon be an object lesson and experiment in this method of traction which will be very useful to technical men.

Electric Power from the James River.

Mr. E. L. Bemiss, President of the Virginia Electric Railway & Development Co., will receive proposals until May 16 for building a dam in the James River to be used in connection with the power plant this company will build. Several old buildings located on the site of the proposed power house are being demolished and the site will be cleared up by June 1. A contract has already been let by this company to the Babcock-Wilcox Co. for four 2,000 h. p. water tube boilers for an auxiliary steam plant to take the place of the water power, if need be. It is proposed to begin work on the canal early in June. R. Sherriffs is Chief Engineer. (Feb. 14, p. 143.)

The American Gruson Iron Works.

The Gruson Iron Works, of New York City, was incorporated in Albany this week, with a capital of $500,000, to make chilled iron armor, gun carriages, cast iron turrets, casemates and chilled and unchilled castings of iron and steel. The Directors are: P. H. Griffin and T. Guilford Smith, of Buffalo; Thomas Prosser, Ernst Thalmann and Herbert L. Satterlee, of New York City; C. W. Barnum, of Lime Rock, Conn.; D. Townsend, of Philadelphia; S. Singer, of Paris, France, and A. E. Piorkowski, of Magdeburg, Germany. While the articles of incorporation cover the privileges named, the principal business of the company will be to make circular plates of chilled cast iron for turrets for coast defense forts and other similar purposes and not in any sense of the word armor plate, as stated in the daily newspapers. The company has acquired from the Fried. Krupp Grusonwerk the patents and details for making chilled cast iron. Capt. Piorkowski, one of the incorporators of the Gruson Iron Works, has long represented certain Krupp interests in this country. He is an officer of the German Imperial Artillery, now retired.

The Vimotum Gasoline Car.

The Vimotum Hydrocarbon Car Co., Great Northern Building, Chicago, is arranging to build a motor car equipped with a 100 h. p. gasoline engine. This will be similar to the 45 h. p. car illustrated in our issue of May 5, p. 313. In the title of one of those engravings the car was referred to as the "Jewett gasoline motor car." This was misleading, as the Jewett Car Co. built only the car body; the system described is controlled solely by the Vimotum Hydrocarbon Car Co.

An American Bridge for Burmah.

This time it is the Pennsylvania Steel Co. which is bothering the Britisher. That company has taken a contract for a railroad viaduct in Burmah, about 80 miles from Mandelay. Lord George Hamilton, replying to questions in the House of Commons last Tuesday, said that this order had been given, not by the Indian Government, but by the Burmah Railway Co., which invited bids from six English and two American firms. Four of the English firms declined to bid, and the most favorable tender received from England was £116,000, the work to be finished in three years. The best American bid was £60,125 and completion in one year. Naturally, the company accepted the American bid. Lord George Hamilton added that the Indian Government always gave preference to British manufacturers, but he regretted to say that this was not the first contract in which there was a difference in price and time in favor of the American bidder.

THE SCRAP HEAP.

Notes.

The Maine Central is equipping two cars with apparatus for oiling the roadbed.

The Legislature of Texas has passed a law making it a felony for any railroad officer or agent to discriminate by giving rebates.

The Postmaster General has ordered that the sign "U. S. Mail" must not be carried on a street car except when the car actually contains mail matter. It is said that a labor convention in a western city complained that the success of strikes was sometimes interfered with by the use of this sign on cars which carried passengers only.

The Legislature of Rhode Island has passed a law protecting the title of railroad companies to their land, notwithstanding the use of such land by an adjoining owner; in other words, the continued occupancy of the land by the non-owner for a series of years shall not give him any title. The law provides similar protection of a private owner against a railroad occupying his land. In the same state a law has been passed forbidding the establishment of a grade crossing without the consent of the State Railroad Commissioner; but persons aggrieved at a decision of the Commissioner may appeal to the Supreme Court.

At a meeting of the Brotherhood of Locomotive Engineers at Cape Charles, Va., last Sunday, Mr. Arthur made an address in which he declared that the day of strikes was past. Mr. Arthur holds that the three serious strikes in which his brotherhood has been engaged are to be charged to the ill-advised action of hot-headed railroad officers, who refused to submit vexed questions to arbitration. Mr. Arthur evidently believes that hot-headed officials have been mostly retired.

Chicago Street Paving.

The Board of Local Improvements on May 3 let contracts for paving parts of seven streets with asphalt pavements at a total cost of $112,064.25. The paving of seven other streets was ordered to be proceeded with, the pavements being granite, brick and cedar. State St. from Sixteenth to Twenty-second St. was among the latter, the pavement to be granite. Two asphalt paving companies reduced their bids from $2.02 to $1.90 a sq. yd. to meet competition, the saving on the contracts let being $10,000.

Erie Track Elevation.

Last Sunday the passenger trains entering the Jersey City station by the Erie Railroad first passed over the elevated tracks, which hereafter will be in regular use. The work is by no means completed, but is going on fast. Meantime, a number of tracks are ready and will be used from this time on.

Paving in Chicago.

Complying with an order passed by the City Council, April 24, Commissioner of Public Works McGann has asked the various street railway companies to pave the space between their tracks along their rights of way, in accordance with the ordinances under which they operate. Much of this paving is in bad condition, particularly in the business district. Contracts were let April 26 by the Board of Local Improvements for the paving of portions of four streets with macadam and granite, at a cost of about $42,000.

Tramways in Gothenberg.

Consul Bergh, of Gothenburg, informs the State Department that the City Council, at its last meeting, decided to purchase the franchise and stock of the Gothenburg Tramways Co. for $340,655. It has not yet been settled whether the city will build and manage the road itself, or lease the franchise to a Swedish or a foreign company. It has been proposed to organize a home company, but owing to the present high prices paid for money, it is doubtful if this can be realized. A German company has offered to build and manage the electric roads under certain conditions, but the Council decided that these conditions were not sufficiently defined.

The Cape Cod Canal Again.

In the Massachusetts House of Representatives today the Committee on Harbors and Public Lands reported reference to the next General Court of the bill to revive the charter of the Massachusetts Maritime Canal Co., which proposes to build a Cape Cod canal between Buzzard's Bay and Sandwich.

Track Elevation at Chicago.

Work on the elevation of the tracks of the Chicago, Rock Island & Pacific from Sixty-ninth St. to Seventy-eighth St. was begun last week.

Danger on the Elevated.

The civilized world knows that the Health Board of the City of New York has its eagle eye on the unfortunate and derelict elevated railroads of that city. The inspectors of the Health Board have already discovered many grave defects in the structure and in the whole management. For example, the "expert engineers," who are acting as inspectors for the Health Board, have discovered that the cast-iron shields over the concrete at the bases of the pillars are, in some cases, cracked, and this discovery is made known to the traveling public that the innocent may not blindly go to their destruction. But the most alarming condition has been found by the vigilant Dr. Michael B. Feeney, Chief Sanitary Inspector for the Board of Health. It appears that he walked underneath the structure and watched the trains passing overhead, knowing full well that he could only discover the absolute rottenness of things by looking at the underside of the train. There he found what we had little suspected, that "the wheels of the engines wobbled considerably." How long must this be endured?

Southern Car & Foundry Co.

The Southern Car & Foundry Co. has been duly organized under the laws of New Jersey and has acquired the properties of the Elliott Car Co., the Lenoir Car Co. and the Memphis Car Works.

The Syria-Ottoman Railway.

The chief organizers of the Syria-Ottoman Ry. Co. are: Mr. J. R. Pilling, Effiingham House, Arundel St., Strand, London, and Mr. H. Hills, of the Thames Iron Works, London. The proposed capital is $5,000,000, but no shares will be put on the market until the line is completed as far as Nazareth. The road will run from Haifa, a seaport 75 miles south of Beirut, to Damascus, some 142 miles, and the project includes an extension from Damascus to Bagdad and the Persian Gulf. While the Jaffa-Jerusalem (54 miles), the Beirut-Damascus-Hauran (153 miles), and the Lebanon Tramway (10 miles) are narrow gage, the Haifa-Damascus Ry. will be standard gage. Work began in February on the division between Haifa and the Jordan, and the line is to be completed in less than two years as far as Damascus. Sir Douglas Fox (28 Victoria St., London) is the Chief Engineer of the Syria-Ottoman Ry., while Dr. G. Schumacher (Civil Engineer and United States Consular Agent) is Superintendent of Works at Haifa, assisted by Mr. H. T. Foord, agent of the company. The Thames Iron Works being crowded with orders, it is likely that rails, locomotives and other material will be bought in the United States.

The Chicago Drainage Channel.

The Secretary of War has issued an order permitting the opening of the Chicago Drainage Channel. The order announces that it is the intention of the Secretary to submit the questions connected with the work of the Sanitary District of Chicago to Congress and that the permit now issued is subject to the action of Congress. It is also stipulated that if the current created in the Chicago River be unreasonably obstructive to navigation or injurious to property the War Department will close the channel or order it modified as seems necessary. Further, the Sanitary District of Chicago must assume all responsibility for damages to property and navigation by reason of the introduction of a current in the Chicago River. This order was issued May 8 and is signed by the Secretary of War and the Chief of Engineers.

Klondike Gold for Railroad Men.

Mr. L. H. Gray, General Traffic Manager of the White Pass & Yukon Route, the railroad from Skaguay, Alaska, to the mountain summit on the way to the Klondike, wants a trade-mark for his road; and as poets and artists are not very numerous in the country traversed by the line, he offers a prize of $25 to American railroad men for a suitable design. Preference will be given to a funnel design, whatever that may mean. For ourselves, we should think it would be necessary to have two funnels. Into one of them the gold-seeker could pour the money with which he starts from home; and into the other he could pour the dust which he sends back to his wife and children. But perhaps one would answer, after all; for the money could be poured in at the large end and the artist could treat the small end in accordance with the views of the man who poured out his wealth. If such a fortune-hunter succeeds he wants to see issuing from the small end a stream of dust under pressure—a pressure high enough to make this stream as valuable as the one which goes in. If he does not succeed, he will have to be represented as coming out of the little end of the horn himself.

An Electric Vehicle Co.

The Illinois Electric Vehicle & Transportation Co. was incorporated at Trenton, N. J., May 5, with an authorized capital of $25,000,000, and at Springfield, Ill., with a capital of $10,000. The new organization, of which Mr. Samuel Insull, of Chicago, is President, is controlled by the Electric Vehicle Co., which has bought the stock of the reorganized Siemens & Halske Co. of America, and its Chicago plant, which was formerly that of the Grant Locomotive Works. Mr. C. E. Yerkes, President of the Siemens & Halske Co., has resigned and Isaac L. Rice, of New York, has been elected in his place. The new company will build and operate electric cabs, delivery wagons and trucks in Chicago, and it is said that 250 of the cabs will be built at the Siemens & Halske plant and put in operation as soon as they can be completed. The plant covers seven acres and can employ 2,000 men. It will be put in shape at once for its new work.

South American Notes.

The Amazon Telegraph Co. has at last decided to abandon the cable in the river Amazon from Para to Manaos, but a land line is being constructed by the same company with some reaches of cable. The company has issued bonds for the sum of $625,000 with interest at 5 per cent. The paid-up capital amounts to $1,250,000. A subsidy was granted by the Brazilian Government amounting to $85,625 a year for 20 years.

The directors of the Bahia & Sao Francisco Railroad Co., of Brazil, have declared interum dividends of 4 per cent. on the main line and 3 per cent. on the Timbo branch.

It has been officially announced that negotiations are proceeding for an amalgamation of the Central Argentine and the Buenos Ayres & Rosario Railroad companies. The benefits anticipated from this movement are, 1st, a saving of train mileage and more efficient train service; 2, lower rates; 3d, to save unnecessary capital expenditure for purposes of competition, and 4th, a saving in administration expenses. The receipts of the Buenos Ayres & Rosario Co. for 1898 amounted to $1,110,000, with operating expenses at 55.55 per cent. The Central Argentine is also a successful line, with operating expenses kept down to 50.39 per cent. The former operates 914 miles and the latter 845 miles.

A remarkable accident occurred recently on the Southern State Railroad in Chile when four trains came into collision almost simultaneously. All the engines were wrecked and many cars demolished. One passenger was killed and twelve injured. The damage to rolling stock is estimated at $200,000.

Chile has recently presented an object lesson in State control of railroads. Tenders were called in 1895 for the prolongation of the great trunk railroad and contracts were signed. It turns out that only a preliminary survey had been made and as a result the first section has been completed and the contractor has sent in bills to the tune of $2,338,166, or $77,938 per kilometer, equal to $125,869 a mile. The contractor, it appears, was obliged to make alterations in the original location and plans and so is entitled to full payment of the sum demanded.

After a conference between President Errazuriz, of Chile, and President Roca, of Argentine, it has been agreed to appoint a commission to study and report upon the most feasible plans for a trans-Audine railroad. The Argentine Government having secured the partial completion of its section, which is now maintained at large expense, is anxious for the completion of the line, and it is thought that steps will now be taken to conclude the matter during the term of President Roca.

In order to relieve the congestion of traffic in the streets of Buenos Ayres an aerial tramway for freight is about to be constructed from the Once de Setiembre railroad station along a number of the principal business thoroughfares to the Plaza Constitucion.

The Buenos Ayres Great Southern Railroad reports gross receipts for the last six months of 1898 of $3,953,899, with operating expenses at $1,746,832, or 44.18 per cent. The company has declared a half yearly dividend at the rate of 6 per cent. on common stock. The mileage operated in 1898 was 1,514, which has recently been increased to 1,702 miles.

A New Fleet of Boats for the Rutland Railroad.

President Percival W. Clement, on May 5, bought the fleet of eight freight boats of the Ogdensburg Transportation Co. The Rutland recently bought the Ogdensburg & Lake Champlain and is building a connecting link to Rouse's Point, N. Y. The boats will be run in connection with the system.

Electric Lighting at Chicago.

The work of stringing between forty and fifty miles of electric light wires for the installation of 500 new lights on the North Side will be commenced this week, under the direction of City Electrician Ellicott. Parts of 14 streets will receive the new lights and part of the power will be furnished from the new part of the power will be furnished from the new lighting plant at Rice and Lincoln streets. At present the North Side has only about 300 arc lights, and the new ones will be paid for from the appropriation of $150,000 noted in our issue of last week, page 301. The City Council has authorized the Electrical Department to use city property in Wentworth Ave. near Sixty-third St. for a new power station. Two vertical compound condensing engines of 700 h. p. each have been ordered from the Elmes Engineering Co., of Chicago, at a cost of $12,375, one for the new Englewood station, and one for the station at Halstead St. and Blue Island Ave. No boilers will be bought, but those for the new plant will be transferred from other city plants. Ten 150-light dynamos have been ordered at $2,360 each. Five will be Brush machines built by the General Electric Co., and five will be Western Electric dynamos. Of these, four will be placed in the new Sixty-third St. (Englewood) station, two in the Halstead St. station, two at Rice and Lincoln Sts. station, and two are not yet assigned. About 800 arc lights will be required in all, bids for which have been received.

Electric Railroads in Cuba.

The Havana Electric Ry. Co., which is composed mainly of Canadians, and incorporated in January in New Jersey, has been organized with the following directors: A. F. Gault, Edwin Hanson, W. M. Donall and Frank Paul, of Montreal; W. D. Mathews, of Toronto; B. F. Pearson, of Halifax, N. S.; G. B. M. Harvey, New York, and Percival Farquhar, New York. Mr. F. S. Pearson, of New York, is Chief Engineer of the company, and under his supervision plans have been made for electrifying the railroad, which runs from Regla to Guanbacoa and through each of these two towns, and recently taken over by this company. The work is expected to be finished Aug. 1. It will then probably be the first electric railroad in Cuba. The company also owns the Regla Ferry, running from Havana across the bay to Regla, there connecting with another line owned by the company.

Chicago City Engineers.

Assistant City Engineer R. O'S. Burke has been appointed Superintendent of the Bureau of Sewers, Chicago, to succeed F. E. Davidson, resigned, and took up his new duties April 25. Robert B. Wilcox succeeds to the position of Assistant City Engineer in charge of new bridges and harbor improvements, which work has been done by Col. Burke for the past 15 years.

LOCOMOTIVE BUILDING.

The St. Louis Southwestern has just placed an order with the Rogers Locomotive Co. for three 10-wheel engines.

The Southern is in the market for 15 consolidation and six 10-wheel locomotives, to be built from standard designs of the road.

The Mississippi, Colesburg & Manchester, a new road, will want two locomotives. R. C. Currie, of Colesburg, Ia., is General Manager.

The Wabash has ordered two eight-wheel locomotives from the Baldwin Locomotive Works like those illustrated in our issue of March 24.

The Quebec Central has ordered two eight-wheel passenger engines, with 18-in.x24-in. cylinders, from the Canadian Locomotive & Engine Co.

H. K. Porter & Co. have recently received an order for a heavy standard gage switching locomotive for use at the U. S. Navy Yard, Norfolk, Va.

Cablegrams from London announce an order for 20 locomotives placed by the Great Central of England with the Baldwin Locomotive Works. The order had not been received on this side at time of going to press and no details were obtainable.

U. S. Consul Rayndal, at Beirut, Syria, states that owing to the inability of the Thames Iron Works, one of the contractors for the Syria-Ottoman Railway, to make early deliveries, the orders for rolling stock for that road will be placed in this country.

H. K. Porter & Co. have just shipped four compound locomotives, with 14-in. and 22-in.x20-in. cylinders, for the Batoum District, Russia, and are now at work on four additional machines for Russia, one consolidation and three six-driver engines. They are also at work on a small 24-in. gage locomotive for gold mines in Auckland, New Zealand.

The two mogul locomotives ordered from the Rogers Locomotive Co. by the St. Paul & Duluth, and referred to last week, will weigh about 132,000 lbs., with about 113,000 lbs. on the driving wheels and have 20-in.x26-in. cylinders, 54-in. driving wheels; Belpaire boilers, with 236 iron tubes 2 in. in diam.; fireboxes, of steel, 120 in. long and 33⅜ in. wide, and a tank capacity for 3,500 gals. of water and six tons of coal. The engines will be equipped with New York air brakes.

The one simple consolidation locomotive ordered from the Baldwin Locomotive Works by the Colorado & Southern April 12, and noted in our issue of April 21, is for September delivery. It will have cylinders 19 in. x 26 in., drivers 51 in. in diam., will weigh 138,000 lbs., of which 123,000 lbs. will be on the drivers. It will have wagon top type boiler, steam pressure 180 lbs., fire-box 107¾ in. long and 33⅜ in. wide, tank capacity for water 4,500 gals., and for coal 14 tons. It will be equipped with Westinghouse air brakes, Sterlingworth brake beams, Standard couplers, Metropolitan injectors, Coale safety valves, Nathan lubricators, Pickering springs, Standard tires and magnesia lagging.

As noted in our issue of April 28, the Western New York & Pennsylvania has ordered four simple consolidation locomotives from the Baldwin Locomotive Works. They will have cylinders 19½ × 26 in., drivers 51¼ in. in diameter, and will weigh 126,000 lbs., of which 140,000 lbs. will be on the drivers. They will have Belpaire boilers, working steam pressure of 190 lbs., fire-boxes 108 in. long and 40 in. wide, tank capacity for water 4,200 gals., and coal capacity 8 tons. They will be equipped with Westinghouse air brakes, iron axles, Gollmar bell ringers, Sterlingworth brake beams, Corning brake shoes, Janney couplers, United States headlights, Hancock inspirators and Monitor injectors, Coale muffled safety valves, Leach sanding devices, Nathan sight-feed lubricators, Ashcroft steam gages and cast steel wheel centers with Standard tires.

CAR BUILDING.

The Manistee & Northeastern is building 15 cars at its own shops.

The Cold Blast Transportation Co. will soon order 500 refrigerator cars.

The Youngstown Car Mfg. Co. is building 300 coal cars for the J. H. Somers Fuel Co.

We are officially informed that the Illinois Central has ordered no freight cars from the Wells & French Co., as stated by a contemporary.

The Mississippi, Colesburg & Manchester, soon to be built, will want 10 or 12 cars. R. C. Currie of Colesburg, Ia., is General Manager.

The Southern is in the market for two 60-ft. postal cars, three 60-ft. baggage cars, 10 first-class wide vestibule coaches, 500 ventilated box cars, 500 double hopper bottom coal cars and 10 cabooses.

The Atchison, Topeka & Santa Fe is building at its Topeka, Kan., shops, 200 more 80,000 lb. box cars for the San Francisco & San Joaquin Valley. These are part of the 1,000 cars which it was proposed to order, the details of which were given in our issue of March 17, the cars being afterward withdrawn from the market on account of the high prices. Five chair cars are also being built at the Topeka shops.

We noted in our issue of April 28 that the Central of Georgia would build some cars at its shops. We are now officially informed that 60 box cars are being built, which will be 36 ft. long, 8 ft. wide and 7 ft. high, all inside measurements. They will weigh 33,000 lbs., and have a capacity of 70,000 lbs. They will have steel axles, trussed I-beam bolsters, Sterlingworth brake beams, Congdon brake shoes, New York air brakes, Gallagher couplers, Moore doors, Butler draft attachments, Fox pressed steel trucks and spiral springs.

As noted in this column last week, the Georgia Southern & Florida is building 300 cars at its Macon, Ga., shops. These are to be 60,000 lb. flat cars, 42 ft. long over end sills and 8 ft. 10½ in. wide over side sills. They will weigh 25,500 lbs. and will have wood frames and metal underframes. They will be equipped with American cast steel body and truck bolsters, Sterlingworth brake beams, cast iron brake shoes, Westinghouse air brakes, Hien couplers, Butler draft attachments, McCord journal boxes and French springs. In addition to the 300 flat cars, this road is rebuilding about 25 40,000 lb. capacity cars to fill missing numbers.

The Brooklyn Heights has ordered 50 closed car bodies from the American Car Co.

The Houston, Oak Lawn & Magnolia Park (Houston, Tex.) will need two new motor cars. (See Elec. RR. Construction column.)

The First Avenue Cable Co. of Seattle, Wash., which proposes to change to an electric road, will probably be in the market for new rolling stock.

The Bangor, Hampton & Winterport has ordered three open and four closed motor cars and three open and three closed trailer cars from the J. G. Brill Co.

The Lansing, St. Johns & St. Louis, a proposed electric railroad, will want 15 closed motor cars. George E. Fisher, 1322 Majestic Building, Detroit, Mich., is General Manager and Purchasing Agent.

BRIDGE BUILDING.

BALTIMORE, MD.—A petition has been presented to the County Commissioners asking a change of location of several roads at Lake Station and to pay the cost of a bridge necessitated by the change.

BAY CITY, MICH.—The following bids were received April 22 by the Bridge Commissioner for the bridge over the west channel of the river at Cass Ave.: W. C. Grisdale, duplicating the present swing with wood, $1,800; Youngstown Bridge Co., Youngstown, O., steel bridge, $7,882; King Bridge Co., Cleveland, O., new iron bridge, $6,300, without lumber; proposition to erect a draw span now located at Lorain, O., for $3,850; for shortening it to 200 ft., $200 extra; all lumber to be furnished and the old swing torn down.

CHICAGO, ILL.—The Sanitary District, on May 3, awarded contracts for building two Scherzer rolling lift bridges on the Chicago River. One contract for a double-track bridge at the crossing of the Chicago Terminal Transfer Company's tracks, between Taylor and Twelfth Sts., was awarded to the Pennsylvania Steel Co. for $297,384.96; the second contract went to the Chicago Bridge & Iron Co., amount $71,040.20, for a highway bridge in Taylor St. Both bridges will replace present center pier structures, and their erection will be superintended by the Scherzer Rolling Lift Bridge Co., which furnished the design. The dimensions of both bridges were given in our issue of Jan. 13, p. 24.

CONNELLSVILLE, PA.—A steam shovel in a B. & O. train caught one of the cables of the highway bridge over the Youghiogheny River and pulled the cable off the saddle block. The bridge is an antiquated structure and was soon to be taken down, to give place to a bridge of two pier spans and three plate-girder spans. The old bridge is a 325 ft. span.

CUMBERLAND, MD.—The Allegany County Commissioners have decided to erect new bridges at Clises Hollow, Miller's Run, near Midland Barton, two at Borden Shaft, Clarysville, two at Allegany mines, Midlothian and Rawlings' Station. Chas. G. Watson, County Surveyor, Cumberland.

DAVENPORT, IA.—Contracts are soon to be let by the County Commissioners for a bridge across the Wapsipinicon River, near McCausland.

EVANSTON, ILL.—Plans are being considered for the abolition of grade crossings in Evanston, but the city authorities have not decided whether to elevate the railroad tracks or to depress the streets.

FORT BENTON, MONT.—A new location has been decided upon for the 214-ft. bridge over the Teton.

FRANKLIN, PA.—J. E. Lawrence, of Hoodville, and J. B. Atwell, of Big Bend, have been appointed viewers for the bridge over the Allegheny River at Scrubgrass. Allen Stranford, of Sandy Creek Township, and Henry Riesinger, of Mineral Township, have been appointed viewers for the county bridge in Frenchcreek Township.

HAILEY, IDA.—The Commissioners of Blaine County will receive bids until May 22 for a new bridge across Wood River, near the site of the present Bullion St. bridge upon the following specifications: One span 100 ft., 16 ft. roadway; piling for substructure, all lumber to be of Oregon fir. Separate bids will be received for combination or steel

bridge of a capacity of 40 tons. W. E. Heard, Clerk to the Board of County Commissioners, Hailey.

HOT SPRINGS, ARK.—A steel bridge of four spans, each of 17 ft., on cylinder piers, according to report, will be built at Gardner's Ferry, Garland County, near Hot Springs. S. P. Van Patten, Chairman County Bridge Committee, 316 Prospect Ave., Hot Springs.

HOUGHTON, MICH.—The Copper Range RR. has awarded a contract to the Phœnix Bridge Co., of Phœnixville, Pa., for steel truss bridges on this new railroad. T. Appleton, Chief Engineer.

HULMEVILLE, PA.—The Commissioners of Bucks County have awarded a contract to the Pittsburgh Bridge Co. for the $16,800 iron bridge across the Neshaminy, at this place.

INDIANAPOLIS, IND.—A meeting of the City Council was recently held to take action in regard to the proposed elevation of railroad tracks in the city of Indianapolis.

The Meridian St. stone bridge, for which plans are about to be prepared, is estimated to cost $50,000.

The Commissioners of Marion County, on April 26 let a contract to Wm. Fife, at $5.95 per cu. yd., for the masonry work of the new bridge to be built over Eagle Creek, at West Michigan St. The bids for the iron work were rejected as being too high. They were: Brackett Bridge Co., $1,815; Lafayette Bridge Co., $1,780; New Columbia Bridge Co., $1,812; Indianapolis Bridge & Iron Co., $1,875.

KANSAS CITY, MO.—Homer Reed, of Kansas City, will need a bridge for a projected electric railroad from Kansas City. (See Electric Railroad Construction column.)

MARYSVILLE, TENN.—The County Bridge Commission on April 29 awarded the contract to the New Columbus Bridge Co., of Columbus, O., for the steel work for the new bridge over Bristol Creek, at $1,400. Eddington, Ross & Co., of Knoxville, have the contract for the stone work at $1,600.

NEW BEDFORD, MASS.—J. H. Benton, representing the N. Y., N. H. & H., has made an agreement with the representatives of New Bedford and Fairhaven that the Fairhaven bridge over the Amherst River shall be completed by a commission to be appointed by the Bristol County Superior Court, which shall apportion the expense between the Old Colony road, the Commonwealth and the City of New Bedford. Some 1,100 ft. remain to be built.

NEW KENSINGTON, PA.—The contract for the masonry work of the bridge to span the Allegheny River between New Kensington and Bouquet Station, on the West Penn. RR., was let May 3 to Stratton, Lewis & Co., of Pittsburgh. The bridge will be 1,150 ft. long, of five spans; roadway, 22 ft. wide. The estimated cost of the whole structure, $100,000. (March 24, p. 215.)

NEW LONDON, CONN.—The Central Vermont RR., according to report, will build a new 40-ft. drawbridge at Hallam St. It is also reported that a new bridge will be built at Riverside Park to replace the present wooden structure.

NEW YORK, N. Y.—The League of American Wheelmen are endeavoring to have a cycle path built on the New York and Brooklyn bridge.

PITTSBURGH, PA.—W. E. Thompson, County Controller, will receive bids until Wednesday, May 17, for the superstructure and masonry of 13 steel through plate-girder iron bridges and for building of four stone arch bridges, located as follows: (1) Over Streets Run, at Willock Station; bridge 27 ft. extreme length; static load, 680 lbs. per lineal ft. (2) Over Deer Creek, at Alexander Hughes'; bridge 31 ft. 6 in. (3) Over Painters Run, at John Hoffman's; bridge 44 ft. (4) Over Piney Fork Creek, at Beam's; bridge 44 ft. (5) Over Narrows Run, at Dr. L. F. Arensburg's; bridge 36 ft. (6) Over Bull Creek, at Howe's; bridge 64 ft. (7) Over Abers Creek, at mouth of creek; bridge 44 ft. (8) Little Bull Creek, at Harrison's old mill; bridge 31 ft. 6 in. (9) Over Flaugherty's Run, near Shousetown; bridge 50 ft. (10) Over Miller's Run, at Millertown; bridge 46 ft. (11) Over Long Run, at William Hayden's; bridge 32 ft. (12) Over Campbell's Run, at John Holmes'; bridge 46 ft. (13) Over Montour Run, at Enlow Station; bridge 32 ft. (14) Over Plum Creek, at Center; segmental stone arch bridge 16 ft. span. (15) Over Montour Creek, at Thomas Datt's; segmental stone arch bridge 18 ft. span. (16) Over Sawmill Run, at St. Ann's Catholic Church; semicircle stone arch bridge, 12 ft span. (17) Over Wildcat Run, at Buena Vista; segmental stone arch bridge, 22 ft. span. Plans and specifications can be had from Chas. Davis, County Engineer.

The Pittsburgh & West End Traction Co. will build a bridge over Chartier's Creek, near Heidelberg.

POTTSVILLE, PA.—The City Council has been petitioned for an overhead bridge on East Race St.

ROCHESTER, N. Y.—The Governor on May 9 signed the bill of Senator Armstrong, which provides for the construction of a bridge over the Erie Canal at Rochester, and appropriating $75,000 therefor.

SCRANTON, PA.—The Scranton Ry. Co. will probably build a viaduct across the D. & H. railroad tracks in Moosick.

SONORA, CAL.—J. B. Doyle, Clerk of Ortega County, informs us that no bridges are under consideration by the county at the present time. (April 28, p. 303.)

TORONTO, ONT.—It is stated that the contract for the abutments of the Queen St. bridge has been awarded to W. S. Gibson for $13,900. There were six tenders for the work, ranging from $13,900 to $17,027. The Humber St. bridge abutment contract was given to the City Engineer for $4,500. The Eastern Ave. bridge abutment contract was awarded to W. F. Grant & Co., of Toronto, for $4,070.96.

VERA CRUZ, MEXICO.—The Tehuantepec National Ry., which was reported sold to English capitalists, it is said will rebuild the bridges, which are mostly of wood and number 322. (See Railroad Construction column.)

WATERBURY, CONN.—The Waterbury Traction Co. will build a bridge over the Naugatuck to extend its lines to Oakville.

WATERPORT, N. Y.—The Board of Supervisors has granted the request of the town of Carlton to issue bonds to build the $14,000 high bridge at Waterport. (March 3, p. 159.)

WHEELING, W. VA.—The Commissioners of Ohio County have let a contract to the Pittsburgh Bridge Co. for three bridges. Two are 51½ ft. long and the other 70 ft.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Chicago, Burlington & Quincy.—Quarterly, 1½ per cent., payable June 15.

Georgia Southern & Florida.—New preferred, 1¼ per cent., payable May 10.

Maine Central.—Quarterly, $1.50 per share, payable July 1.

Third Ave. RR. (N. Y.)—Quarterly, $1.75 per share, payable May 31.

West Chicago St. RR.—Quarterly, 1½ per cent., payable May 15.

St. Louis Railway Club.

A meeting of the St. Louis Railway Club was held Friday, May 12, at the University of Illinois, at Champaign-Urbana. The trip was made over the Wabash RR. by courtesy of that company, leaving Union Station, St. Louis, on the Wabash Continental Limited, at nine a. m. and leaving Champaign Station at five p. m. There was no regular program.

At the regular meeting, April 14, Mr. John J. Baulch, General Freight Agent of the Wiggins Ferry Co., St. Louis, was elected President; H. C. Barnard, Superintendent of the B. & O. S. W. Ry., Washington, I. d., elected First Vice-President; C. W. Waughop, Chief Joint Car Inspector, East St. Louis, Second Vice-President; Geo. M. Burns, Fuel Agent, Wabash RR., St. Louis, Third Vice-President; S. S. Scarritt was re-elected Treasurer and H. H. Roberts, 512 Commercial Bldg., St. Louis, elected Secretary.

Western Society of Engineers.

At a meeting of the Western Society of Engineers, Wednesday evening, May 3, Mr. G. W. Smith, Assistant Superintendent of Bridges and Buildings of the Chicago, Milwaukee & St. Paul, presented a paper, "A Railroad Pile Driver," being a description of the construction and working of a pile driver used by that road, which has an unusually long reach. The general question of pile driving was considered in the paper and in the discussion which followed. Also, Mr. W. A. Rogers of the Engineering Department of the same road, read a paper which was entitled "Some Notes on Concrete in Freezing Weather." Probably the Chicago, Milwaukee & St. Paul uses concrete more extensively than any other road in this country, and its engineers are particularly well informed on the subject. Both papers will soon appear in the Society "Journal."

Civil Engineers' Club of Cleveland.

A regular meeting of the club was held at Case Library on Tuesday evening, May 9, 1899, at eight o'clock. A general discussion upon "The Desirable Qualification in Technical School Graduates" was the order of the evening.

A regular meeting was held at Case School of Applied Science on April 11, 1899. The laboratories were open at seven o'clock and were visited by many members and friends. The new 100-ton testing machine and the steam turbine received special attention. The meeting was called to order at 8.15 p. m. in the Electricity Building by Vice-President John W. Langley. Present 33 members and 15 visitors. A letter from Mr. Ambrose Swasey was read containing the announcement that he had presented the club with a new projection lantern.

Prof. Chas. H. Benjamin then read the paper of the evening, entitled "The Power Consumed by Shafting and Belts." It was illustrated by slides. The experiments described in the paper were made on the shafting and belts used to drive the machine shop at the school, by the aid of a Flather recording dynamometer. The dynamometer itself was shown, being driven by a motor in such a manner as to show its operation.

In these experiments the horse power required to drive the shaft alone was found to be about one-third that required for shaft, belts and loose pulleys. The effect of flooding the shaft bearings with oil was clearly shown on the diagram. When the shop was run under ordinary conditions the friction of the shafting and belts was found to consume more than half of the total power. When the machines were worked to their full capacity the power was distributed about as follows: Cutting metal, 43 per cent.; empty machines, 32 per cent.; shafting and belts, 25 per cent.

The semi-monthly meeting was held at the Central Manual Training School, April 25, 1899; called to order by President Jared A. Smith at 8.20 p. m. Present, 22 members and 7 visitors.

The paper of the evening was read by Mr. Lewis C. McLouth. The subject was "Manual Training."

PERSONAL

(For other personal mention see Elections and Appointments.)

—Mr. W. M. Hughes has been appointed Bridge Engineer of the Chicago Sanitary District.

—Mr. Edward Wilmann, who for several years past has been Assistant Bridge Engineer of the Chicago Sanitary District, has been appointed City Engineer of Bridges of Chicago.

—Mr. Frank Bruce, who was Master Mechanic of the Great Northern Railroad, died at Great Falls, Mont., April 14, aged 53 years. Mr. Bruce entered the railroad service in 1870.

—Mr. Samuel H. Beck, who was Superintendent of the Perry County Railroad, died April 29 at New Bloomfield, Pa., aged 52 years. Mr. Beck was born in Millerstown, Perry County, Ohio, in 1847, and entered the railroad service in 1889. Mr. Beck has been connected with the Perry County Railroad since its beginning.

—Mr. C. C. Rush, Superintendent of the Joliet, Ill., Street Ry. Co., died in that city May 3 as the result of injuries received on that day at Lemont, Ill., when he was struck by a train on the Chicago & Alton road. Mr. Rush was born in Champaign, Ill., and was 35 years old. He had been connected with the street railroad at Champaign, Quincy and Joliet, Ill., and Bay City, Mich., for about eight years.

—Mr. Horace Stanley Rearden has been elected General Manager of the Omaha, Kansas City & Eastern, and the Omaha & St. Louis railroads, with headquarters at Quincy. His appointment took effect on the 10th. Mr. Rearden has a thorough knowledge of all the branches of operating, as he has held the several posts of Station Agent, Operator, Locomotive Engineer, Freight and Passenger Conductor, Trainmaster, Division Superintendent and General Superintendent, and with all this experience he is a man of judgment and energy.

—Mr. William Pierson Judson, M. Am. Soc. C. E., has been appointed Deputy State Engineer of New York, in place of Mr. H. V. Roberts, resigned. Mr. Judson has served for nearly 30 years under the Engineer Bureau of the War Department, principally along the Lakes and the St. Lawrence River. He has long been known as a student of harbor and canal matters. Mr. Judson was born in Oswego, N. Y., in 1849. He is a Member of the Institution of Civil Engineers (London), and a member of the Association of Electrical Engineers.

—Mr. W. W. Wheatly, who has been appointed Assistant General Superintendent of all the lines owned or controlled by the Brooklyn Rapid Transit Co., was for more than twenty years identified with steam railroad interests. From 1875 to 1879 he was telegraph operator and dispatcher for the Chesapeake, Ohio & Southwestern, now a part of the Illinois Central; between that time and 1884 Mr. Wheatly held the position of Train Dispatcher on the Chicago & Northwestern, leaving there to become Chief Train Dispatcher for the West Shore. He later served as Assistant Superintendent and was finally made Car Accountant of the West Shore, which position he resigned in 1896 to become Division Superintendent of the Brooklyn Heights Railroad. It was on the West Shore that Mr. Wheatly first became associated with Mr. McCormack, now the General Superintendent of the lines of the Brooklyn Rapid Transit Co. Mr. Wheatly is known to many of our readers as Secretary of the New York Railroad Club.

—Mr. Ira A. McCormack, heretofore General Superintendent of the Brooklyn Heights Railroad, has been made General Superintendent of all the lines of the Brooklyn Rapid Transit Co., which now aggregate nearly 500 miles of surface and elevated railroads, the largest street railroad system in the world. Mr. McCormack is particularly well fitted for the position he is to fill, having a thorough knowledge of handling traffic and men acquired by many years' connection with steam railroads. Mr. McCormack began as telegraph operator on the Pittsburgh & Connellsville, now a part of the Baltimore & Ohio, and served successively as brakeman, conductor, Freight and Ticket Agent and General Yardmaster (at Homewood) of the Pittsburgh, Fort Wayne & Chicago; General Yardmaster of the West Shore at Newark, N. Y., and Trainmaster of the same road; Trainmaster of the Pittsburgh & Lake Erie, and Trainmaster of the New York Central & Hudson River in charge of the Hudson River Division, between New York and Albany. In 1892 Mr. McCormack went to Chicago in the interests of the Hall Signal Company, which company was then installing signals on the Chicago & Northwestern and Illinois Central for handling the World's Fair traffic, and resigned to become Trainmaster of the Lake Shore & Michigan Southern between Buffalo and Cleveland. On August 1, 1895, he left the last named position to become General Superintendent of the Brooklyn Heights Railroad. Mr. McCormack possesses the confidence of President Rossiter and is liked by the employees of the road. He is of commanding presence, and has a robust constitution.

—Mr. Charles M. Higginson, Assistant to the President, Atchison, Topeka & Santa Fe, died at his home in Riverside, near Chicago, Ill., on May 6, of heart failure which followed an attack of typhoid fever from which Mr. Higginson had been suffering for several weeks. Funeral services were held at the Episcopal chapel at Riverside on Monday, May 8, and a special train was run over the Chicago, Burlington & Quincy from Chicago for those who attended.

Mr. Higginson was born in Chicago, July 11, 1846, and was educated at the Lawrence Scientific School of Harvard University. In 1867 he entered the engineering department of the Chicago, Burlington & Quincy, and remained with that road until 1875 when he became Secretary and Purchasing Agent of the Toledo, Peoria & Warsaw, at Peoria. At the end of one year he returned to the Chicago, Burlington & Quincy as Purchasing Agent, which position he filled until March, 1879, when he was made Assistant Auditor of that road, being in charge of the operating statistics and having other special duties. When Mr. Ripley was elected President of the Atchison, Topeka & Santa Fe, Mr. Higginson was appointed Assistant to the President, and had special charge of the coal interests of the road. This position he held at the time of his death. For several years he was President of the Chicago Academy of Sciences, and he was a member of the Board of Managers of the Young Men's Christian Association. He leaves a widow, one daughter (Mrs. V. K. Spicer), and two sons. Mr. Higginson was well known as a mechanical expert and statistician, and in his death the road with which he was connected loses an able and very faithful officer.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—D. L. Gallup has been elected Secretary and Treasurer, and S. L. Crim, Auditor, with headquarters at Chicago, Ill.

Baltimore & Ohio.—The jurisdiction of J. H. Glover, Superintendent of the Ohio and Midland Division is again extended over the Lake Erie and Straitsville Divisions on the lines west of the Ohio River. G. A. Richardson, Assistant Superintendent, will have charge of the Ohio and Midland Divisions. W. C. Hayes has been appointed Locomotive Superintendent.

J. R. C. Wrenshall, heretofore Division Engineer Maintenance of Way, with headquarters at Cumberland, Md., has been appointed Supervisor of Road on the Philadelphia Division.

Bellefonte Central.—At the annual meeting of the stockholders held May 1, Chas. S. Whelen was elected a Director, succeeding Henry Whelen, deceased.

Carrabelle, Tallahassee & Georgia.—S. D. Crittenden, General Manager, has been elected Vice-President.

Central Vermont.—G. B. Reeve, General Traffic Manager of the Grand Trunk, will also assume the duties of General Traffic Manager of the C. V.

Chesapeake Beach.—C. F. Winn has been appointed Master Mechanic.

Chicago, Burlington & Quincy.—E. J. Blake, heretofore Chief Engineer, has been appointed Consulting Engineer, with headquarters at Chicago, Ill., succeeding Robert J. McClure, deceased. W. L. Breckinridge has been appointed Chief Engineer, with headquarters at Chicago, Ill., succeeding E. J. Blake. D. Cunningham, heretofore Assistant Superintendent of the Chicago, Burlington & Northern, a part of the C., B. & Q., has been appointed Superintendent of the Northern Division, with headquarters at La Crosse, Wis.

Chicago, Rock Island & Pacific.—The jurisdiction of A. J. Hitt, General Superintendent, will be confined to the lines east of the Missouri River, with headquarters at Chicago, Ill., and W. H. Stillwell, heretofore Assistant General Superintendent, has been appointed General Superintendent of the lines west of the Missouri River, with headquarters at Topeka, Kan.

Columbus & Northern.—The officers of this company referred to in the Construction column are: President, A. O. Bailey; Vice-President, A. J. Clark; Secretary, H. P. Olcott, and Treasurer, W. R. Merrill, all of Columbus, N. M.

Delaware & Hudson Canal.—At a meeting of the stockholders held May 9, David Willcox was elected a Director, succeeding James Roosevelt, deceased.

Delaware, Lackawanna & Western.—F. F. Chambers, heretofore Secretary and Auditor, has been elected Treasurer, succeeding F. H. Gibbens, resigned.

John M. Daly, late Superintendent of Transportation of the Illinois Central, has been appointed Superintendent of Transportation of the D., L. & W., with headquarters at Scranton, Pa.

Grand Trunk.—W. W. Ashald has been appointed Trainmaster of the Sixth and Seventh districts, with headquarters at Belleville, Ont., succeeding F. W. Egan, transferred.

Houston East & West Texas.—At a meeting of the stockholders held April 26, Howard F. Smith was elected a Director, succeeding C. Lombardi, resigned.

Illinois Central.—J. C. Dailey, heretofore Trainmaster on the St. Louis Division, has been appointed Superintendent of the Amboy Division, with headquarters at Clinton, Ill., succeeding J. W. Higgins, transferred.

Lehigh Valley.—George J. Gildroy, heretofore Trainmaster of the Pittsburgh & Lake Erie, has been appointed Trainmaster of the Mahanoy & Hazleton Division of the Lehigh Valley, with headquarters at Hazleton, Pa., succeeding G. W. Brill.

Mexican Central.—At a meeting of the stockholders held May 3, H. R. Nickerson was elected Vice-President and General Manager, and Robert Fleming, of London, Eng., and Henry Nichols, of Boston, Mass., were elected Directors. The following appointments were effective May 1: E. E. Styner, General Superintendent, with headquarters at City of Mexico; Geo. F. Hawks, Superintendent of the San Luis Division, with headquarters at Cardenas, Mex., succeeding E. E. Styner.

Mississippi, Colesburg & Manchester.—The officers of this company, referred to in the Construction column, are: President, James Prentice; Vice-President, John V. Bush; Secretary, W. C. Kirchheck; Treasurer, George Klaus, and General Manager, R. C. Currie, all of Colesburg, Ia.

Mobile & Ohio.—Richard Carroll, Vice-President and General Manager, with headquarters at Mobile, Ala., has resigned.

Nashville, Chattanooga & St. Louis.—J. T. C. Davis has been appointed Assistant Superintendent.

Nevada-California-Oregon.—J. M. Fulton, Master of Transportation, with headquarters at Reno, Nev., has resigned, and that office has been abolished.

New York, New Haven & Hartford.—Stephen M. Burns, Supervisor of the Naugatuck Division with headquarters at Waterbury, Conn., has resigned.

Omaha, Kansas City & Eastern.—We are officially informed that B. S. Josselyn, who recently resigned as Superintendent of this company, has not been appointed General Manager of the Northern Lines.

Horace Stanley Rearden has been appointed General Manager of this company, and the O. & St. Louis, with headquarters at Quincy, Ill. Effective May 10.

Peoria & Pekin Union.—M. L. Morris has been appointed Engineer, with headquarters at Peoria, Ill.

Pittsburgh & Lake Erie.—H. P. Pierce has been appointed Trainmaster, with headquarters at McKee's Rocks, Pa., succeeding G. J. Gildroy, resigned.

Port Angeles & Eastern.—W. H. Garlock has been appointed Master Mechanic, with headquarters at Port Angeles, Wash.

South Carolina & Georgia.—The absorption of this company into the Southern Ry. has brought about the following changes: President, Samuel Spencer, 80 Broadway, New York; First Vice-President, A. B. Andrews, Raleigh, N. C., and Second Vice-President, William Lummis, 37 Wall St., New York.

Southern Pacific.—C. E. Wermuth, heretofore Assistant Auditor of the Atlantic System, has been appointed Auditor of the same system, with headquarters at New Orleans, La.

Union Pacific.—John W. Hay, heretofore Trainmaster, has been appointed Assistant Superintendent, with headquarters at Laramie, Wyo., succeeding Chas. Culross, resigned.

Virginia & Southwestern.—We are officially informed that W. B. Emmert has been appointed General Freight and Passenger Agent, with headquarters at Bristol, Tenn. Dayton H. Miller has been appointed Auditor, with headquarters at Bristol.

Wabash.—E. B. Pryor, Assistant Auditor, has been appointed Assistant Secretary, succeeding H. A. Lloyd, resigned.

RAILROAD CONSTRUCTION,
New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—Paul Morton, Second Vice-President, is quoted as stating that many improvements on the system are to be pushed forward during the year. It is estimated that $1,000,000 will be spent in tracks and $500,000 in grading, masonry and bridge work, in order to complete the improvements now proposed and under way. There will be 250 miles of new rail laid on the main line, so that by the end of the year the entire line from Chicago to Albuquerque, N. M., will be practically new steel.

Grading is in progress on the Kansas, Oklahoma Central & Southwestern line recently bought, which is projected to run from Caney on the Atchison south to Bartlesville, I. T. (April 14, p. 271.)

ATLANTIC COAST LINE.—About two miles of track is reported laid on the cut-off between Petersburg, Va., and Stony Creek. (Dec. 9, 1898, p. 885.)

BELLINGHAM BAY & BRITISH COLUMBIA.—Press reports state that the entire roadbed of this line is being re-ballasted.

CALIFORNIA NORTHWESTERN.—A contract has been let to Carr & Bagly of Santa Rosa, Cal., for 60,000 ties to be used in the extension of the San Francisco & Northern Pacific northwest about 60 miles into the redwood forests of Mendiceno and Humboldt counties. (Sept. 19, 1898, p. 603.)

CANSO & LOUISBURG.—The route of this new line in Cape Breton, N.S., is from Hawkesbury via St. Peters, L'Ardoise and Grand River, and through the Loch Lomond district to the head of Mira River; thence toward the shore near Gabarus Bay, and on to Louisburg, with several branches. The charter empowers the company either to bridge or tunnel the Strait of Canso and to establish ferries.

CENTRAL NEW YORK & WESTERN.—(See Railroad News column.)

CHICAGO, BURLINGTON & QUINCY.—Press reports from the West state that grading is already completed for the extension from Alliance, Neb., west to Gering. This is no doubt under the Nebraska, Wyoming & Western incorporation, to run across the State of Wyoming to its western boundary. (April 21, p. 289.)

CHIHUAHUA & PACIFIC.—Grading is completed for 105 miles from Chihuahua, Mex., and track is laid for 37 miles from Chihuahua to Santa Isabel, on this proposed line from Chihuahua west via Santa Isabel, San Andres, Bustillos, San Antonio and El Rosario toward Guerrero. About 200 km. (124 miles) from Chihuahua west is under contract for grading to McCarthy & Reichardt, Little Rock, Ark., and J. M. Dudley, Chihuahua, Mexico; and for masonry to J. S. Qualey & Co., Chicago. Two branches are proposed from San Antonio to Cusihuiriachic, 14 miles, and from Santa Isabel to San Magistral, 16 miles. The company has 120 steel bridges on substantial masonry, four viaducts and two tunnels (now finished), each about 120 meters long. All the bridges are contracted for, the viaducts are practically finished and two have been shipped from the Pencoyd Iron Works. The line is laid with 60-lb. steel rails. The maximum grade is 2%, and the maximum curve 8° metric. Of the line, 73% is tangent. (Nov. 4, 1898, p. 804.) Edward S. Safford of Chihuahua, Mex., is Chief Engineer, and A. H. Paget of 80 Broadway, New York, is President. (Official.)

CINCINNATI, GEORGETOWN & PORTSMOUTH.—Financial arrangements have been made, according to report, for building the extension of this line from Georgetown, O., southeast 23 miles to West Union. (April 22, 1898, p. 300.)

CINCINNATI NORTHWESTERN.—A company is being formed in Cincinnati, O., headed by Powell Crosby, 420 Pike Bldg., to build a railroad under this title from Richmond, Ind., south about 50 miles through the counties of Wayne, Union, Fayette and Franklin to connect with the Cleveland, Cincinnati, Chicago & St. Louis.

CITY TERMINAL.—This company is incorporated in Missouri, with a capital stock of $50,000, to build terminals at Kansas City. Among the incorporators are: F. Hagerman, J. V. C. Karnes, J. L. Karnes, O. Hochland, F. A. Krauthoff, all of Kansas City.

COLUMBUS & NORTHERN.—Surveys are in progress for this proposed line from Columbus, N. M., north to Deming, Grant County, connecting with the Southern Pacific and the Atchison, Topeka & Santa Fe. (March 31, p. 235.) The officers are given under Elections and Appointments.

GRAND RAPIDS & INDIANA.—The General Manager writes with reference to the proposed improvements in Southern Michigan that the company does not propose to rebuild or relay that portion of the line, but is putting in a little more new steel than usual in order to make up for the shortage in the past two years, and is also gradually replacing wooden bridges with steel. (April 28, p. 305.)

HALIFAX & COLCHESTER.—The Nova Scotia Legislature has granted this company a charter of incorporation to build a railroad through Stewiacke Valley from Brookfield to Eastville.

HIDALGO & NORTHEASTERN.—The extension is to be built at once from the present terminus at Tortugas, Mexico, northeast through Hidalgo State to Tuxpan, 152 miles. It is stated that upon the completion of this a further extension will be made northeast from Tuxpan to Tampico. Tomas Mancera of Mexico City is Traffic Manager.

HOLLY RIVER & ADDISON.—Grading is completed from Palmer, W. Va., to Jumbo, and track laid from Palmer to Diana, 16½ miles, on this line from Palmer southeast 21 miles via Holly to Jumbo. There are 50 men at work. (Jan. 6, p. 15.) John T. McGraw, of Grayton, W. Va., is President, and George A. Hechmer, of Palmer, is General Manager. (Official.)

HUMBOLDT, DYERSBURG & TIPTONVILLE.—Right of way is being secured for this line, incorporated in Tennessee last December with a capital stock of $1,500,000, at the junction of the Louisville & Nashville and the Mobile & Ohio, to run northwest to Dyersburg, and thence north to Tiptonville, about 60 miles. F. S. Bates and T. S. McTighe are among the incorporators. (Dec. 30, 1898, p. 938.)

INTERNATIONAL & GREAT NORTHERN.—Press reports state that numerous improvements are being carried out on this line, including the filling in of culverts, raising the roadbed, etc., so as to reduce the grade from 66 ft. per mile to a maximum of 31 ft. The old rails are being replaced with new 75-lb. steel.

INVERNESS & RICHMOND.—The Richmond County (N. S.) Council at the annual May meeting voted this road a bonus of $1,000 a mile, and right of way from the Richmond County line to a point on the Strait of Canso or Fort Malcolm, Richmond County. (March 31, p. 235.)

KANSAS & SOUTHERN.—It is proposed to begin building at once this line from Westmoreland, Kan., to Blaine, nine miles. The maximum grade is two per cent. and the grading good. Contracts are to be made at once. (Dec. 30, 1898, p. 938.) W. H. Wheatcroft, of St. Louis, Mo., is interested. (Official.)

LAKE SHORE & MICHIGAN SOUTHERN.—Press reports state that the Jamestown & Franklin Junction is to be double tracked from Ashtabula to Plymouth, four miles, and that changes of grade and of alignment are necessitated.

MINNEAPOLIS & ST. LOUIS.—Contracts were let at Minneapolis May 4 for the extension from New Ulm south 135 miles to Storm Lake, Ia., on the Illinois Central, as follows: Johnston Bros. & Faught of St. Elmo, Ill., 100 miles; John Scott & Sons, St. Louis, Mo., 35 miles.

MISSISSIPPI, COLESBURG & MANCHESTER.—Surveys are made, right of way is being secured and financial matters negotiated for this proposed line from Dyersville, Ia., on the Chicago Great Western, northwest 16 miles via New Vienna and Petersburg to Colesburg. The grades are comparatively easy. The date of letting contracts is not determined. J. Whitney Beales, Jr., is the Boston representative. (Jan. 27, p. 73.) The officers are given under Elections and Appointments. (Official.)

NATIONAL TEHUANTEPEC.—Pearson & Co., the London contractors, who have been making extensive improvements on this line, propose to take it over for operation in August. It is stated that among the repairs proposed are 322 bridges, mostly of wood, which are to be replaced with steel. (March 10, p. 180.)

NORFOLK & WESTERN.—This company, according to report, will build a branch from Radford, Va., southeast about 25 miles to Floyd Court House.

NORTH DAKOTA ROADS.—Surveys are reported in progress for a railroad from Bismarck north about 40 miles up the Missouri River to Washburn. W. D. Washburn of Minneapolis is said to be back of the project.

ONTARIO & RAINY RIVER.—Letters patent have been granted to the Ontario & Rainy River Contracting & Supply Co., Ltd., with a capital stock of $80,000, to build this road. Among the incorporators are James Conmee and Alexander William Thompson of Port Arthur. Wm. T. H. White, Chief Engineer, states that the road will cross the Minnesota State line at or near the Township of Attwood, where it will connect with the Manitoba & Southeastern. (April 7, p. 253.)

PHILIPPINE ISLAND ROADS.—R. C. Stone of London has come to this country to complete the organization of a syndicate of English and American capitalists to build railroads in the Philippine Islands.

PITTSBURG & WESTERN.—Extensive additions to freight tracks are being added at Chardon, O. A "Y" has been built and at least 10 additional tracks will be laid. About 15 acres of land has been secured for the tracks.

PONTIAC PACIFIC JUNCTION.—The Dominion Railway Committee has favorably reported the act which gives this company power to extend its line from Waltham, Que., to Sault Ste. Marie, crossing the Ottawa River at Allumette Island. (May 5, p. 324.)

SAN PETE VALLEY.—Final location has been completed for the proposed branch from the main line at Salt Springs, Utah, five miles from Nephi, to run north three miles to Nebo salt works, thence west 3¼ miles up Salt Creek canyon to Nebo quarry. Contracts for grading were to be let May 1. The other work is to be done by the company. The grading is difficult, maximum grade being 5%; maximum curve 15°. The rails are purchased. (April 21. p. 299.) Theodore Bruback of Salt Lake City, Utah, is President. (Official.)

SANTA ANA & NEWPORT NEWS.—New surveys have been made for the extension into Los Alamitos, Cal. (Feb. 10, p. 109.)

SOUTH CAROLINA & GEORGIA EXTENSION.—The stockholders have decided to bond this road for $1,800,000 to build the proposed extension from Gaffney, S. C., southwest about 21 miles to Spartanburg, paralleling the Southern. The S. C. & G. E. was formerly leased to the South Carolina & Georgia, but became independent upon the taking over of that road by the Southern, as noted last week. It was formerly the Ohio River & Charleston.

SOUTHERN INDIANA.—Grading is begun, according to report, on the proposed extension from Elnora, Ind., southwest 46 miles to Terre Haute. (April 28, p. 305.)

SUWANNEE & SAN PEDRO.—This company has been formed in Florida with a capital stock of $50,000 to build a railroad in Suwannee County to the Suwannee River, about 15 miles. R. B. Daniel and E. C. Bixler, of Jacksonville, Fla., are interested.

TENNESSEE EASTERN & WESTERN.—An act incorporating this company became a law in Tennessee, April 21. The proposed line is from Knoxville southwest 200 miles to Memphis. The act is an amendment to the charter of the Gallatin, Murfresboro, Florence & Sheffield, passed in 1887, to build a line from Gallatin south to the State line in Lawrence County.

TIFTON, THOMASVILLE & GULF.—Surveys are completed and it is understood that contracts have been let for this proposed line from Tifton, Ga., southwest about 50 miles, via Obe and Moultrie to Thomasville. Geo. W. Parrot, of Atlanta, Ga., is among those interested.

WABASH.—On the Canadian section 80 miles of new steel is to be laid at once between Delhi and Glencoe. The hills will be cut down at Cayuga and Renton, and the road will be reballasted; also several cuts and fills will be made.

Grading is reported in progress on the new line from Moulton, Ia., north 27 miles to Albia. (March 31, p. 236.)

The company proposes, according to report, to extend its Quincy & Hannibal branch further into the city of Quincy, Ill., and expend about $250,000 in that city within the next 90 days.

WEST VIRGINIA & SOUTHERN.—Sherman District in Boone County, W. V., has voted to issue $10,000 bonds to aid this company in the proposed extension from the Boone County line south over the mountains to Racine, the county seat. (April 14, p. 270.)

WHEELING & LAKE ERIE.—The new officers, according to report, will at once begin improvements, including double tracking between Steubenville, O., and Wheeling.

WYOMING ROADS.—Grading is reported in progress for a road from Wendover on the Colorado & Southern to the Hartville iron mines, which have been leased by the Colorado Fuel & Iron Co. It is probable that the C. & S. is not building the road. (C. & S., April 28, p. 305.)

T. J. Milner, late Chief Engineer of the Denver (Col.) Board of Public Works, is making surveys for the proposed line from Fort Steele south about 25 miles to Saratoga. It is stated that Boston capitalists are back of the project. (April 28, p. 305.)

WYOMING, SOUTH DAKOTA & EASTERN.—This company has been incorporated in South Dakota with a capital stock of $6,500,000 to build a railroad from Rapid City on the Chicago & Northwestern east 120 miles to Pierre. The main office is Rapid City. The officers and directors are. President, J. R. Brennan, Rapid City; Treasurer, J. W. Fowler, Rapid City; Directors, V. T. Price and Myron Wilsie, Rapid City, and A. Everett, C. H. Burke, C. S. Bennett and H. E. Horder, Pierre.

Electric Railroad Construction.

BALTIMORE, MD.—The Edmondson Ave. line of the United Railways & Electric Co. is completed and in operation between Baltimore and Ellicott City. This road was built wth the idea of becoming part of the Columbia & Maryland Ry. projected between Baltimore and Washington. When this project stopped the road was sold to the Consolidated Ry. Co. of Baltimore, and with other properties is included in the consolidation by the United Railways & Electric Co.

BANGOR, ME.—We are informed that the New England Ry. Construction Co. has the contract for additional work proposed by the Bangor, Hampton & Winterport Ry. Six miles of grading and track laying is completed between Bangor and Hampden. J. G. Brill & Co. have the contract for the proposed equipment, which will consist of three open and four closed motor cars and three open trailer cars. The road will shortly be extended to Winterport or Frankfort. (Jan. 20, p. 54.)

BROOKLYN, N. Y.—The necessary permits have been issued for the change from steam to the overhead trolley system on the Brighton Beach RR. and the Prospect Park & Coney Island RR., now controlled by the Brooklyn Rapid Transit Co. The permit carries with it the right to cross 59 highways from Atlantic Ave. to Brighton Beach.

BUFFALO, N. Y.—The Ridge Road & Lake Shore RR. Co., recently incorporated to build an electric railroad from West Seneca to Hamburg, has elected the following officers: President, Henry J. Pierce; Vice-President, W. B. Cutter; Secretary, Clark L. Ingham; Treasurer, W. H. Gratwick, Jr. (May 5, p. 324.)

CAMDEN, N. J.—Three companies have made application to the Camden Council for a franchise for a double track on Haddon Ave.

CARROLLTON, KY.—The franchise for the electric railroad over the streets of Carrollton was sold at public auction April 28 to the Carrollton Electric Ry. & Bridge Co. Myron I. Barker, President. (March 24, p. 218.)

CATSKILL, N. Y.—The Catskill Electric Ry. Co., May 2, filed a certificate of increase of capital stock from $30,000 to $400,000. The road now operated is two miles long; it is proposed to build several extensions. Louis E. Roberts, Chairman, 290 Hall St., Brooklyn.

CLEVELAND, O.—The Cleveland City Ry. has a franchise before the Council of Lakewood for a double track extension from Gordon Ave. to Rocky River, which will parallel the Lake Ave. boulevard. If the franchise is granted the company will build a cross-town line on Gordon Ave., extending from Edgewater Park to Denison Ave., and west on Denison Ave. to Richmond Ave., and out to the new cemetery in Lakewood.

CHICAGO, ILL.—The Wisconsin & Inland Lakes & Chicago Ry. ordinance providing for an electric railroad from Kinzie St. through the northwest part of the city was placed on file by the Committee of Railroads of the City Council May 5. This practically buries the ordinance, which has been previously mentioned in this column.

The extension of the Chicago Electric Traction Co.'s line from Blue Island to Harvey is being pushed and will probably be completed by June 1, giving the town of Harvey direct street car connection with Chicago. (Feb. 10, p. 109.)

DENVER, COL.—The Municipal Traction Co. has been incorporated with a capital stock of $1,000,000 for the purpose of building street railroads in Denver in opposition to the company recently formed by the consolidation of several of the present operating companies. T. S. McMurray is interested in the new company.

EAU CLAIRE, WIS.—Arthur E. Appleyard of the Chippewa Valley Electric Ry. is said to be organizing a new company to be known as the Chippewa Falls & Bloomer Ry., to build the electric railroad to Bloomer as an extension of the present railroad system. (March 17, p. 198.)

ERIE, PA.—The International Construction Co., of Detroit, Mich., is reported to have a contract from the Erie Rapid Transit St. Ry. Co. for building the northeast extension.

EVANSVILLE, IND.—Application has been made to the County Commissioners for right of way over the New Harmony Pike by the Evansville & Southern Ry. Co., in which W. L. Caten of Dayton, O., is Vice-President. (March 17, p. 198.)

HAGERSTOWN, MD.—Douglass Bros. of Middletown, Pa., who propose to build an electric railroad from Hagerstown to Myersville, have petitioned the City Council of Hagerstown for a 50-year franchise over the following streets: Frederick, Baltimore, Locust, Church, Washington and Salem avenue, with connections with the Baltimore & Ohio, Western Maryland and Cumberland Valley railroads. (Frederick, April 14, p. 272.)

HARRISBURG, PA.—The work being done by the Harrisburg Traction Co. is relaying the road in Main St. with 107 lb. girder rails, and the work is nearing completion.

HOUSTON, TEX.—The Houston Belt & Magnolia Park RR., formerly a steam road and recently sold, will, under the new company, be known as the Houston, Oak Lawn & Magnolia Park RR. It is the plan of the new company to immediately equip with electricity the road as far as Oak Lawn, 2½ miles from the Houston terminal. Work is about completed on repairing the roadbed, etc. The road will be operated in the afternoon and all day Sundays and in the evenings, and for special occasions, as picnics, holidays and other celebrations, through to Magnolia Park, which fronts on Buffalo Bayou, 6½ miles from the Houston terminal. The improvements will necessitate two first-class motor cars. The new company will be composed of some of the business men of this city and of Jonathan B. Frost of Atlanta, Ga.

At a meeting of the directors of the Sour Lake Springs Co. it was decided to arrange for an electric railroad connection with Sour Lake, and J. E. Newton was appointed chairman of the committee with this object in view. T. H. Thompson, of Houston, is President of this company.

IRWIN, PA.—The Westmoreland Traction St. Ry. Co. was incorporated May 2 with a capital stock of $20.000. by A. Frank and B. E. Humphreys of Irwin and F. L. Fry of Manor, Pa.

KANSAS CITY, MO.—The Metropolitan St. Ry. has an ordinance before the City Council for the extension of the Broadway Electric line on 17th and Holly Sts. The company agrees to begin building within 30 days after the passage of the ordinance.

Homer Reed of Kansas City is reported interested in a project to build an electric railroad between Kansas City and Platte City, via Parkville, about 26 miles long, necessitating one bridge.

LANSING, MICH.—We are informed that the Lansing, St. Johns & St. Louis Ry. Co. was incorporated in April, with a capital stock of $500,000, and as soon as subscriptions amount to $250,000 a general contract for building and equipment will be made. The road will be 55 miles long, electric, running from Lansing, Ingham County, north into Clinton County through St. Johns and Maple Rapids, Ithaca, St. Louis and Alma in Gratiot County. The road will be standard gage and probably 60-lb. rails will be used. Surveys are already made. The proposed equipment is 15 closed motor cars. The officers are: President, Frederick Thoman; Vice-President, Isaac Hewitt; Secretary, Frank L. Dodge; Treasurer, Jacob Stahl. Geo. E. Fisher, 1322 Majestic Bldg., Detroit, is General Manager and Purchasing Agent.

LEWISTON, PA.—The Lewiston & Reedsville Electric Ry. Co. will place a contract for building the proposed seven miles of electric railroad about May 15. The rails will be supplied by the Pennsylvania Steel Co. J. N. Van Zandt, General Manager, 41 West Market St. (March 10, p. 181.)

LOGANSPORT, IND.—The Clinton County Commissioners have granted right of way along the Michigan road to the Indianapolis & Logansport Traction Co. This company has already secured considerable right of way through other counties. (Feb. 10, p. 110.)

LOS ANGELES, CAL.—The Pacific Electric Ry. Co., which was incorporated in California in February, filed articles of incorporation in Arizona April 28, with a capital stock of $200,000. The incorporators named are I. W. Hellman, H. E. Huntington, Antoine Borel and H. W. Hellman, all of California, and E. Randolph and Chas. Drage, of Arizona. The object of the company is to build an electric railroad from Phœnix, Ariz., to Tempe, and own electric street railroads in Los Angeles, where the office will be. (Feb. 17, p. 133.)

LOUISVILLE, KY.—An ordinance has been introduced in the City Council providing for the sale of a franchise for 20 years for building a double track electric railroad through Eighteenth and Dumesnil Sts. The Louisville Ry. Co. will probably make the extension.

MAPLEWOOD, MO.—The Maplewood & Jefferson Barracks RR. Co., which has secured nearly all the necessary right of way, has been incorporated with a capital stock of $100,000. The incorporators are James T. Donovan, John F. McDermott and Joseph E. McGennis. (Feb. 17, p. 133.)

MEMPHIS, TENN.—The Memphis St. Ry. Co. has a petition before the Council for a new line on Union St. and an extension into the suburbs.

MINNEAPOLIS, MINN.—The Twin City Rapid Transit Co. is said to be considering the advisability of extending its Minnehaha line to Fort Snelling. This would make a third interurban line to Fort Snelling. Contracts for the extension of the T. C. R. T. to Stillwater, 12 miles, will probably be let in another week, so as to have the road in operation by July 1. (April 7, p. 255.)

MONTREAL, QUE.—The Montreal Island Belt Line Ry. has been authorized to build a branch line along Davidson St., in Montreal, to the Montreal Cotton Mills Company's factory. Permission has also been granted to increase the bonded indebtedness.

MONTVILLE, CONN.—Work is begun on the Montville St. Ry., which is to connect Norwich and New London, 600 men being employed. The general contract is held by J. F. Shaw & Co. of Boston, and all contracts for material have been let, as already stated in this column. S. Reed Anthony is President. E. P. Shaw, Jr., 28 Exchange Building, Boston, is Secretary, Manager and Purchasing Agent, and P. L. Saltonstall, Treasurer. (May 5, p. 325.)

NEW MARLBORO, MASS.—The Street Railroad Committee of the Massachusetts Legislature has reported a bill to provide that H. D. Sisson, H. K. Bloodgood and others shall be incorporated as the Berkshire & Canaan St. Ry. Co. The road is to run from the northerly line of New Marlboro, at Lake Buell, southerly through the villages of Hartsville, New Marlboro, Southfield, Mill River and Clayton to the Connecticut State line, where it will connect with the Canaan St. Ry. The capital is $100,000 and the bill gives the company the right to carry passengers, baggage and express matter.

OTTAWA, ONT.—The Ottawa Electric St. Ry. has agreed to extend the tracks two miles to the Rockliffe rifle ranges if the Government will pay part of the cost. The Railway Committee of the Privy Council has confirmed the act allowing the company to run cars on Sundays.

PASADENA, CAL.—The work to be done by the Los Angeles & Pasadena Electric Ry. Co. consists of relaying two miles of track. Two miles of single track are also to be built in the city of Pasadena, and the work will probably be begun within one month. It is not the intention to let contracts for this work. (April 28, p. 307.)

PATCHOGUE, L. I.—A meeting of the directors of the Patchogue & Port Jefferson Traction Co. was held in Port Jefferson May 1 to consider the proposition of a Philadelphia contractor to build the 15 miles of proposed trolley road. Edwin Bailey, President.

PHILADELPHIA, PA.—Two bills have been introduced in the Council, one for the Lindley Ave. RR. Co. to use Lindley and Windrim avenues in the Twenty-second Ward and the other is for the Fisher's Lane Ry. Co., to use various streets in the Twenty-second Twenty-third and Thirty-fifth wards. The ordinances stipulate that the company shall begin work within six months and finish within two years. These companies were incorporated in the early part of February, and at the time were said to be in the interest of the Union Traction Co., the incorporators of which, George W. Elkins and Richard F. Bower are two, are the same for both companies.

The Philadelphia, Morton & Swarthmore St. Ry. Co. is gradually securing the necessary right of way for the proposed road, having already acquired it on Parker Ave. through Collingdale to Glen Olden. (March 13, p. 163.)

PHILLIPSBURG, N. J.—The Easton Transit Co. of Easton, Pa., which proposes to extend the Phillipsburg Horse Car RR., has been granted right of way in Lopatcong and Pohatcong townships. In Pohatcong a trestle about 1,000 ft. long will be necessary. (April 14, p. 273.)

PHŒNIX, ARIZ.—The Pacific Electric Ry. Co. was incorporated April 28, by I. W. Hellman and others. See Los Angeles, Cal., above.

PITTSBURGH, PA.—Men are now at work finishing the Carnegie, Heidelberg & Bridgeville branch of the Pittsburgh & West End Traction Co. The company has the right of way through Glendale to Heidelberg along the P. C. & Y. RR. A bridge will be built over Chartiers Creek near Heidelberg.

PORT ARTHUR, ONT.—Government Commissioners and John Cooper, Chairman of the Fort William Board of Works, made a tour, April 26, of the Port Arthur Electric Ry., owned by the town of Port Arthur, with a view of extending the road.

ROME, N. Y.—The Rome City St. RR. Co. has been granted permission by the State Railroad Commissioners to increase its capital from $50,000 to $150,000, as recently decided, for the purpose of changing the road to be operated by compressed air. (March 24, p. 219.)

SANFORD, ME.—The State Railroad Commissioners gave a hearing last week on location of tracks for an extension of the Sanford & Cape Porpoise Ry. in Kennebunk. It is stated an agreement has been made with the Boston & Maine to make connections with that road. Ernest M. Goodall is President of the S. C. & P.

SEATTLE, WASH.—The Seattle-Tacoma Ry. Co. was incorporated April 13, with a capital of $1,000,000. Reports state that the original company has been reorganized with the following as officers: President, John Collins; Vice-President, Samuel Wilkinson, Tacoma; Treasurer, H. E. Knatvold, Tacoma. Henry Bucey of Tacoma, the original promoter of this electric railroad, is General Manager. (March 31, p. 237.)

SILVER SPRINGS, N. Y.—Perry, Castile, Silver Springs & Pike Ry. Co. filed a certificate of incorporation at Albany, N. Y., May 9. The capital stock will be $200,000 and the road will be 20 miles long, from the village of Pike through the towns of Pike, Genesee Falls, Gainesville and Castile, to the village of Perry. The villages of Perry, Castile, Silver Springs and Pike to be its termini. The Directors are Joseph M. Duncan and John H. Duncan, of Silver Springs, and G. I. Van Gordon and others, of Pike, N. Y. The office of the company will be in Silver Springs, Wyoming County.

SOUTH BEND, IND.—The Indiana Electric Ry. Co. last week gave a mortgage for $1,000,000 and proposes to begin the immediate building of an electric railroad from South Bend through Berrien County to a point on Lake Michigan, with Grand Rapids as a terminal. Much of the right of way is secured. Subsidies aggregating $50,000 have been voted for building the line from Orlando to Coldwater, which will have Hillsdale as a terminal.

STREATOR, ILL.—The La Salle County Ry. Co., which proposes to build an electric railroad from La Salle east to Ottawa via Utica, thence south across the Illinois River via Grand Ridge to Streator, in all about 30 miles, is securing right of way in these various localities. This company is incorporated with a capital stock of $500,000, and according to the charter, will do a passenger, mail and express business, and also supply electricity for lighting purposes. W. H. Holcomb, 355 Dearborn St., Chicago, is interested.

SYCAMORE, ILL.—The city of Hickley has granted a franchise to the Lake Geneva, Sycamore & Southern Electric Ry. This gives the company

franchises through all the counties, villages and cities from Lake Geneva to Kendall County as far as the road is surveyed. The entire length of this proposed road is 110 miles, the maximum grade being 3½%. The road will begin at Morris in Grundy County, run north through Kendall, DeKalb and McHenry counties to Lake Geneva in Walworth County, Wis. John B. Whalen is General Manager. (Feb. 18, 1898, p. 131; March 24, p. 219.)

TACOMA, WASH.—The General Electric Co. is at work on the Cedar River power plant for the Tacoma Ry. & Power Co., which will control all the street railroads of Tacoma, and which reports state intends to furnish power for the operation of electric lines both in Seattle and Tacoma, as well as for commercial purposes. S. G. Mitchell and George Tripp are representatives of the company in purchasing the street railroads. C. A. Stam and L. J. Webster are in charge of building the power plant.

TRENTON, N. J.—The building of the new trolley line to Lawrenceville and Princeton by the Trenton, Lawrenceville & Princeton RR. Co. has been stopped by order of the Supreme Court. (April 28, p. 307.)

TROY, N. H.—The Granite Ry. Co., which was incorporated in March, we are informed, has two years in which to build and equip the road. If it is built, it will be for the principal use of the Troy Granite Co. in connecting its plant with the Cheshire branch of the Fitchburg RR. The company is not organized.

UTICA, N. Y.—The Utica Belt Line St. Ry. Co. filed, May 3, with the Secretary of State, a notice of abandonment of route through Grove Place, as residents of Grove Place are served with both the Seymour Avenue and Elm Street lines.

WASHINGTON, D. C.—The City & Suburban Ry. Co. has purchased land between Hyattsville and Riverdale Park, which will be used for the power house plant. The company has completed the double track from the District line to Berwyn and from June 1 it will be operated to Hyattsville. Richardson & Burgess of Washington, D. C., are reported to have the contract for the power house.

Work is progressing rapidly on the extension on Benning road by the Columbia Ry. Co. (Dec. 23, p. 925.)

WATERBURY, CONN.—The Waterbury Traction Co. has accepted the town's conditions and will build the 5½ miles of extension northwest to Oakville.

GENERAL RAILROAD NEWS.

BENNINGTON & RUTLAND.—By mistake the statement was made last week (p. 305) that this property went into the hands of a receiver on April 24. The Bennington & Woodford Electric was the road which went into the hands of the Superintendent of the Bennington & Rutland as receiver and reported in the Electric News column at the time.

CENTRAL NEW YORK & WESTERN.—The stockholders have voted to increase the capital stock from $1,000,000 to $2,000,000 to provide for standard gaging the narrow gage division, filling trestles, relaying track with heavier rails and buying additional equipment. It is stated that several short lines have recently been bought to be consolidated with the approval of the State Railroad Commissioners.

CENTRAL VERMONT.—The new company has filed a mortgage for $12,000,000 with the American Loan & Trust Co. as trustee. This secures an issue of 4 per cent. gold bonds due 1920. The proceeds are to be used for acquiring and operating the Central Vermont Ry. and the Burlington & Lamoille Valley; also for buyers of the leases of the New London Northern and the Montreal & Vermont Junction. (May 5, p. 325.)

DULUTH, MISSISSIPPI RIVER & NORTHERN.—Official announcement is made that this property has been bought by the Eastern Minnesota to form part of the Great Northern system. It extends from Mississippi, Minn., via Swan River on the Duluth, Superior & Western line of the Great Northern, to Hibbing, on the Duluth, Missabe & Northern, 36½ miles. Last season it was extended from Hibbing north 15 miles to Dewey Lake. A further extension is proposed of 10 miles to Sturgeon Lake.

CLEVELAND BELT & TERMINAL.—The syndicate which acquired the Cleveland & Canton first mortgage bonds has secured a deposit of over $600,000 of the C. B. & T. out of a total of $902,000, and $2,900,000 stock out of a total of $3,191,000.

DELAWARE & HUDSON CANAL.—The bill has become a law in New York State permitting this company to discontinue the use of its canal and changing its corporate title to the Delaware & Hudson Co.

GILA VALLEY, GLOBE & NORTHERN.—F. J. Lisman & Co. of New York offer $814,000 of the first mortgage 5% gold bonds of this company at 103½ and interest. They are guaranteed by the Southern Pacific.

HOUSTON & TEXAS CENTRAL.—Call has been made for payment of $200,000 of the first mortgage bonds at 110 and accrued interest upon presentation at the office of the company, New York, interest ceasing June 30. The payment is from the proceeds of the land sales.

KANSAS CITY, PITTSBURGH & GULF.—The new reorganization, of which Wm. F. Harrity is Chairman, makes the following announcement:

LEBANON SPRINGS.—Justice Betts has granted to Wm. C. Roberts permission to bring action in the Superior Court for an order against the receiver, Elnathan Sweet, to deliver to him that portion of the railroad that lies in Rensselaer County, N. Y. (Feb. 3, p. 199.)

LONG ISLAND.—At a meeting of the stockholders held at Jamaica, L. I., May 6, it was voted to unify the mortgages by an issue of $45,000,000 50-year gold bonds at a rate not to exceed 4 per cent. per annum, as stated in the issue of April 7 (p. 255). Twenty-eight million dollars is reserved for retiring existing bonds; $1,000,000 for improvements and additions recently made to the property; $2,500,000 for acquisition of additional property and equipping the same for electrical operation; $1,000,000 for abolishing grade crossings; $8,500,000 for changes of motive power to electricity or otherwise, and $4,000,000 for reserve.

MEXICAN NORTHERN.—The State Trust Co., of New York, as trustee, has reserved $28,287 to buy first mortgage bonds of this company at 105 and accrued interest. Sealed proposals will be received at the office of the trustees up to 12 o'clock noon May 29.

MINNEAPOLIS & ST. LOUIS.—The basis for the retiring of the $2,500,000 of the first preferred stock in exchange for new securities is one new $1,000 bond and $35.83 cash for each ten shares of the old stock. Exchanges may be made at any time prior to June 1. (May 5, p. 325.)

MISSOURI, KANSAS & TEXAS.—Forty bonds of the Boonville Railroad Bridge Co. have been drawn for payment for the sinking fund at the Union Trust Co., New York, trustee, interest ceasing July 1.

The recent change in the receivers has not in any way injured your interests. We feel assured that the property will continue to be managed by the new receivers for the benefit of its security holders only, and that they will not be influenced by rival or competing interests. The real matter in controversy is the method of reorganization. The committee first appointed, after four months' delay and repeated promises to announce a plan, have failed to do so.

Our committee expects to announce a plan of reorganization as soon as it can be properly formulated, which plan, it is expected, will receive the support of the foreign holders, representing, as we are informed, a majority of all the securities affected. Pending such action we ask the security holders to communicate with the Chairman of the Committee, care of Equitable Trust Co., Philadelphia, Pa.

The Thalmann Committee announces that at the request of the Amsterdam bondholders, expert accountants have been appointed to examine the books and securities, and an expert has also been appointed for physical examination of the road. The plan will be formulated as soon as these examinations are completed. (May 5, p. 325.)

ST. LOUIS, CAPE GIRARDEAU & FORT SMITH.—This property was sold at auction at Jackson, Mo., May 2, to Albert S. Bard, of New York, representing the reorganization committee, for $425,000. The reorganization plan calls for an issue of $1,000,000 capital stock and $1,000,000 first mortgage 40-year gold bonds. (Feb. 10, p. 111.) The new company is the Southern Missouri & Arkansas. (See below.)

ST. LOUIS, INDIANAPOLIS & EASTERN.—The Central Trust Co., New York, as trustee, has asked a decree of sale against this property in favor of the holders of the $790,000 first mortgage bonds, on which default of interest payment is alleged. The property was transferred to the Illinois Central March 25. (April 7, p. 255.)

SANTA FE, PRESCOTT & PHOENIX.—Harriman & Co. and Fisk & Robinson, of New York, offer for sale at 105 and accrued interest, $1,000,000 of the company's $5,000,000 first mortgage 5 per cent., 50-year gold bonds of September, 1892 ($4,940,000 outstanding), the issue being limited to $25,000 per mile.

SOUTHERN PACIFIC.—Twenty thousand dollars first consolidated mortgage gold bonds of 1893 will be redeemed. Bids will be asked up to noon June 5 at the company's office, San Francisco.

SOUTHERN MISSOURI & ARKANSAS.—This company was incorporated in Missouri May 3, with a capital stock of $17,000,000, to take over the property of the St. Louis, Cape Girardeau & Fort Smith. The Directors for the first year are: Newman Erb, Edward Hidden and H. L. Lamb, C. Lippett, L. Houck, A. S. Bard and L. J. Albert.

UNION PACIFIC.—Special Master Sherman E. Day, on May 15, will pay at the Mercantile Trust Co., New York, the appropriate amounts derived from the foreclosure sales upon the bonds and maturing coupons secured by the sinking fund mortgage of Dec. 18, 1873, interest to cease after that date. (March 10, p. 182.)

WHEELING & LAKE ERIE.—Of the new $24,500,000 stock, $15,000,000 is common, $2,500,000 is first 4 per cent., and $7,000,000 second preferred 4 per cent. non-cumulative. If deemed advisable, the company may issue not to exceed $10,000,000 additional common stock for acquiring other terminal facilities or extensions of securities for other companies. (May 5, p. 326.)

WISCONSIN CENTRAL.—The plan of the reorganization managers has been declared operative and the holders of securities requiring deposit are called upon to deposit the same on or before June 3, with the United States Trust Co., New York, or the Old Colony Trust Co., of Boston. For details, see this column for April 21 (p. 291).

Electric Railroad News.

ATLANTA, GA.—Temporary officers for the Atlanta Ry., which is to be included in the consolidation, were reported elected as follows: President, Ernest Woodruff; Vice-President, Litt Bloodworth, and Directors as follows: Joseph Hirsch, W. L. Peel, L. Z. Fozzer, Joseph Orme and Carroll Payne. (April 28, p. 308.)

BALTIMORE, MD.—The consolidation of the street railroads in Baltimore is reported to have been consummated May 3. Settlements have been made with the holders of the Consolidated Ry. stock and the stock of the new company distributed to the subscribers. The total amount in the transaction involved about $18,000,000, the Maryland Trust Co. being trustees.

The stockholders of the Brush Electric Co., the Northern Electric Co., and the Edison Electric & Illuminating Co., on May 6 ratified the sale of the properties to Alexander Brown & Sons, to be included in the United Railways & Electric Companies of Baltimore. The price paid for the property is said to be $3,525,000. This gives the syndicate full control of the street railroads and electric systems in Baltimore, though they will be managed by separate corporations. The United Electric & Power Co. of Baltimore will be organized, it is said, for the management of the electric lighting companies. To cover the cost of buying the plants and to provide for improvements, an issue of $3,500,000 4½% 30-year gold bonds, and $700,000 of preferred stock will be issued. Of the three electric companies, the Brush is the largest. It is capitalized at $1,250,000, divided into $650,000 preferred and $600,000 common stock; it is bonded for $1,232,500 at 5 per cent. The bonds of the Edison company aggregate $537,000 at 5 per cent. Those of the Northern company amount to $100,000 at 6 per cent.

Wm. Ring, General Superintendent and Electrician of the Baltimore & Northern RR. division of the United Railways & Electric Co., has resigned and will go to Fall River, Mass.

BARRE, VT.—Superintendent T. E. Smith has resigned from the Barre & Montpelier Traction Co., and is succeeded by F. H. Andrews.

BROOKLYN, N. Y.—Clinton L. Rossiter, President of the Brooklyn Rapid Transit Co., issued a general order on April 27 stating that the company having acquired, by ownership or lease, the railroads and properties of the Brooklyn Union Elevated RR. Co., the Nassau Electric RR. Co. and the Brooklyn & Brighton Beach RR. Co., also the railroad and terminals of the New York & Brooklyn Bridge, the management of the properties will after May 1, be under the general officers of the company.

Ira A. McCormack, as General Superintendent, will have charge of transportation. J. C. Brackenridge, as Chief Engineer, will have charge of all construction and maintenance work and the operation of all power houses. A new position is created, that of superintendent of shops, and F. S. Drake is appointed to it with full charge and control of all repair and depot shops on the system, including all construction and maintenance work of electrical equipments, car bodies and trucks, and locomotives; under and report direct to the Chief Engineer. Lincoln Van Cott, as Purchasing Agent, will have charge of all purchasing of supplies and material, upon requisitions made by the heads of departments, and properly approved by the auditing and finance committee.

Pursuant to the above order the following divisions are established and appointments made on the Brooklyn Heights RR. and leased lines. Both took effect May 1: W. W. Wheatly is appointed Assistant General Superintendent. Ridgewood Division, George Goodwin, Superintendent; Southern Division, Charles E. Harris, Superintendent; Central Division, Miller Robbins, Jr., Superintendent; Canarsie Division, R. K. Haldane, Superintendent; Eastern Division, John C. Webb, Superintendent; East New York Division, William F. Duncan, Superintendent; Greenwood Division, Newton W. Bolen, Superintendent; Brooklyn Bridge Division, I. D. Barton, Superintendent; Elevated Railroad System, George Edwards, Superintendent.

At the meeting of the stockholders of the Brooklyn Union Elevated RR., May 3, the following directors were elected: Frederick P. Olcott, Frederick Uhlman, W. Howes, Jr., Wm. F. Sheehan, N. F. Brady, Frederick S. Flower, John V. Clark, Clinton L. Rossiter, T. S. Williams, J. B. Taylor, Ira A. Kipp, Jr., and John S. George.

At a meeting of the Coney Island & Gravesend Ry. Co. May 4, the following directors were elected: C. L. Rossiter, T. S. Williams, H. C. Du Val, D. H. Valentine, John L. Wells, W. M. Littleton, G. V. S. Williams, C. D. Meneely and W. F. Ham. The directors elected the following officers: Clinton L. Rossiter, President; H. C. Du Val, Vice-President; T. S. Williams, Secretary and Treasurer. This Board of Directors replaces the so-called Flynn Board, and marks the transfer of the road from P. H. Flynn to the Brooklyn Rapid Transit. (May 5, p. 326.)

CHICAGO, ILL.—Regarding the report of the sale of the street railroads in Chicago, particularly those in which Mr. Charles T. Yerkes owns stock, by the Widener-Elkins syndicate, matters have progressed so far, it is said, as to be in the hands of attorneys to have the necessary papers prepared. Only the North Chicago St. Ry. and the West Chicago and the Chicago Consolidated Traction Co. are in the deal. The Chicago City Ry. Co., according to report, demand more than the purchasing syndicate is willing to give. The stock of the Yerkes roads will go into the consolidation on a guaranteed interest basis of 6 per cent. on West Chicago stock and 12 per cent. on North Chicago—the present rates of dividends in both cases. In order to take over the properties a new company will probably be formed with a probable capital of not less than $100,000,000 to cover the outstanding securities of the companies to be absorbed.

The price to be paid for Mr. Yerkes' holdings, it is said, will be $130 a share for West Chicago St. Ry. stock and about $260 a share for North Chicago St. Ry. The elevated railroads, it is said, do not figure in the consolidation. Although having sold all his holdings in the N. C. and the W. C., Mr. Yerkes will retain a minority interest in the Chicago Consolidated Traction Co., recently organized by him to operate the suburban lines.

In view of the negotiations for the sale of the various street railroad properties in Chicago, the following table, which is the estimate of the cost to duplicate the present roads, will be of interest. It was prepared under the direction of Mayor Harrison during the recent fight to save Chicago streets from long-time franchises. It follows:

	Stocks and Bonds.	Estimate of Cost.	Miles.
Chicago City Ry.....	$16,619,400	$ 6,000,000	189.72
West Chicago.....	32,315,300	17,500,000	209.27
North Chicago.....	15,148,000	6,035,000	111.64
Ogden Railway	2,576,000	900,000	34.09
Suburban Railway.....	3,000,000	1,500,000	55.00
North Chicago Electric....	2,829,000	1,000,000	42.50
Calumet Electric.....	3,700,000	2,000,000	90.00
Chicago General.....	1,636,000	500,000	30.00
Chicago & North Shore....	1,300,000	500,000	17.00
Chicago Electric Transit..	2,500,000	800,000	37.00
Cicero & Proviso.....	3,900,000	1,500,000	38.18
South Chicago	3,000,000	1,400,000	37.00

Among the owners of the Electric Vehicle & Storage Battery Co. are men who own large interests in street railroads—William C. Whitney, P. A. B. Widener, W. L. Elkins, Martin Maloney, Isaac L. Rice, Thomas Dolan, Anthony N. Brady and Thomas F. Ryan.

Mr. Yerkes has also sold his interests in the Siemens & Halske Electric Co., which is located at Grant. The plans involve building a plant in Chicago for the manufacture of automobile vehicles.

BOSTON, MASS.—Mr. Morse of E. Rollins, Morse & Co., Boston bankers, is said to have confirmed the recent report that plans are maturing for the general consolidation of the electric street railroads in Eastern Massachusetts. The desired properties have been secured, subject to reports of experts now examining them. The consolidation will take in all the roads, about 25 in number, from the northern boundary of Massachusetts to the extreme southern point of Rhode Island. The total trackage will approximate 700 miles. The roads

west of Boston connecting with Worcester, it is said, will not be included.

The capitalization, probably $22,000,000, will be based on the actual cost of the properties, with sufficient additional to provide for the retirement of the floating debts of the roads taken in and any improvements that may be needed, as shown by the experts' reports. The proposed issue of stock is to be divided into 4 per cent. cumulative preferred and common stock. There will be no bonds, and the stock is free from taxation under the Massachusetts laws.

It is denied that J. P. Morgan & Co. have anything to do with the consolidation other than being subscribers to the undertaking. The Union Traction Co., Providence, R. I., and its connecting lines in Rhode Island and Massachusetts are not as yet embraced in the consolidation.

CRIPPLE CREEK, COL.—A syndicate of Colorado Springs capitalists, in which W. S. Stratton is interested, has purchased the Cripple Creek District Electric Ry., and will extend it to Colorado Springs. About 25 miles of track are already operated, reaching mines. The surveyed route to Colorado Springs is 29 miles. An attachment was recently made against this property in favor of the General Electric Co. H. C. S. Dyer, President.

DETROIT, MICH.—The street railroad interest represented by Tom L. Johnson, and the Detroit Street Railroad Commission headed by Governor Pingree, have been unable thus far to decide upon a price for the sale of the street railroads to the city. It is said that the Commissioners have offered $15,000,000 for the properties, to be paid out of the receipts of the lines, the companies to be secured by a new franchise extension in the event of default in payment. The companies, it is said, want $17,100,000 exclusive of a bank account of $400,000.

HAMILTON, O.—Peter Schwab, of Hamilton, heretofore a stockholder in the Cincinnati & Miami Valley Traction Co., has secured a controlling interest in that company, it is said, in the interest of a syndicate which proposes to consolidate several of the electric railroad companies in that vicinity.

HULL, QUE.—The Hull Electric Co. has paid the $100,000 to the Canadian Pacific Ry., for the 24-mile branch of the C. P. between Aylmer, Que., and Hull, and recently sold to the H. E. Co.

INDIANAPOLIS, IND.—Suit is begun by Catherine Darnell against the City Ry. Co., the Indianapolis St. Ry. Co., Randall Morgan and the City of Indianapolis for the appointment of a receiver for the City Ry. Co. and for an injunction to restrain them from accepting any surrender of the franchises of the City Ry. Co. The City company's franchise was recently secured by capitalists who have formed the Indianapolis St. Ry. for control of street railroads in Indianapolis.

The Indianapolis & Broad Ripple Rapid Transit Co., which has been in financial straits for some time, is reported to have sold its property in the interest of the Indianapolis St. Ry. Co., and that Wm. H. Schmidt, of Indianapolis, has been elected President. The I. & B. R. R. T. was built in 1893, and has bonds outstanding amounting to $400,000 which were issued by the late R. T. McDonald, of Fort Wayne. John B. Cockrum, administrator of the estate of Mr. McDonald, is receiver of the company.

LANCASTER, PA.—According to report, preliminaries for the reorganization of the Pennsylvania Traction Co. are completed and the new company will be known as the Conestoga Traction Co., as decided upon some time ago. The P. T. has been in the hands of Wm. B. Given, of Columbia, Pa., as receiver, since the latter part of 1896. The road is about 63 miles long and it is said that the projected lines to New Holland and Ephrata will be built as soon as the financial arrangements are completed. The Directors of the Conestoga will be Samuel R. Shipley, B. J. McGrann, W. B. Givin, John D. Skiles and J. W. B. Bausman.

LAWRENCE, MASS.—The Lowell, Lawrence & Haverhill St. Ry. Co., which was sold to a syndicate represented by J. P. Morgan & Co., was transferred May 1. (April 14, p. 274.)

LOUISVILLE, KY.—The Grand Jury is investigating the affairs of the Louisville Ry. Co., it being asserted that the company is operating without franchises.

MACON, GA.—The Macon Consolidated St. RR. Co. has given a mortgage to the Old Colony Trust Co. as trustee, for $350,000 of 5 per cent. 30-year gold bonds.

MILWAUKEE, WIS.—A mortgage for $5,000,000 was filed in the office of the Register of Deeds May 4 by the Milwaukee Light, Heat & Power Co. to the City Trust Co. of New York. It covers the property and franchises of the Milwaukee & Wauwatosa Motor Ry., the North Greenfield & Waukesha Electric Ry., the Waukesha Electric Ry., and the Waukesha Beach Electric Ry., the Wauwatosa Rapid Transit Ry., the Milwaukee & Wauwatosa Rapid Transit Co., the Milwaukee & Wauwatosa Motor Electric Co., the North Greenfield & Milwaukee Electric Ry., the Milwaukee, Racine & Kenosha Ry., the Belleview St. Ry, and the Milwaukee Light, Heat & Traction Co. The M. L., H. & T. Co. was organized in 1896 by the directors of the Milwaukee Electric Ry. & Light Co., with a capital stock of $500,000. The officers are the same as the M. E. Ry. & Lt. Co.

The Belle City St. Ry. and the Milwaukee, Racine & Kenosha Ry. Co. were transferred April 28 to the M. L., H. & T. Co. (April 7, p. 256.)

NIAGARA FALLS, N. Y.—John C. Brewster, Superintendent of the Niagara Falls & Suspension Bridge Ry. since 1891, has resigned. Under his management the road has been changed from a horse car line to an electric railroad. This company is included in the absorption by the International Traction Co., and for the present C. K. Marshall will manage this property in connection with the Buffalo & Niagara Falls Ry.

NORRISTOWN, PA.—A reorganization of the Schuylkill Valley Co., as reported in this column last week, has been effected whereby its present indebtedness will be refunded and its floating liabilities cancelled. The present capital stock will be increased by $50,000. In addition to the officers mentioned last week, the Board of Directors consists of N. H. Larzelere, Horace C. Jones, Conshohocken; John T. Dyer, Norristown; Frederick Roebling, of Trenton; C. D. Beebe, D. M. Leonard and D. B. Shepp, members of the old board. (May 5, p. 326.)

PATERSON, N. J.—The New Jersey Electric Ry. Co., of which David Young was recently appointed receiver, it is said, will shortly be taken over by a syndicate in the interest of the North Jersey St. Ry., of which Mr. Young is Vice-President. J. E. Howell, of Newark, has been appointed master to conduct the sale. According to the terms of the decree of Judge Kirkpatrick, bidders will be required to deposit a certified check for $50,000 before, and a check for $250,000 after the proposals for purchase have been submitted, making in all $300,000 as part payment. The upset price is $1,000,000. The total amount due on the bonds is about $3,000,000. (April 21, p. 292.)

PENN YAN, N. Y.—At the annual meeting of the stockholders of the Penn Yan, Keuka Park & Branchport Ry., May 1, the following Directors were elected: Edward Donahue, C. L. Tylee, Penn Yan; H. R. Sill, Bluff Point; George S. Weaver, Branchport; F. H. Viele, Keuka College; W. H. Tylee, D. W. Rugg, Worcester, Mass.; W. S. Reed, C. E. Dresser, Leominster, Mass. The Directors chose the following officers: President, W. S. Reed; First Vice-President, C. L. B. Tylee; Second Vice-President, H. R. Sill; Secretary, F. H. Viele; Treasurer and General Manager, W. H. Tylee. C. L. B. Tylee will be continued as Superintendent and F. H. Viele as Auditor.

PROVIDENCE, R. I.—May 3 announcement was made of the sale of the Warwick & Oakland Beach branch of the N. Y., N. H. & H. RR. to the Union RR. Co., of Providence. The U. RR. is the principal street railroad in Rhode Island, and will substitute electricity for steam on this branch, which is 9.90 miles long between Auburn to Buttonwoods, R. I.

QUINCY, MASS.—The stockholders of the Quincy & Boston St. Ry. Co. have been notified by the Directors that persons controlling a majority of the stock of the company have given an option to sell their shares to John R. Graham at $150 per share, which option had been accepted with the understanding that all stockholders shall participate in the sale on the same terms. All stock must be deposited with the Old Colony Trust Co. by May 15, and payment will be made for the same on June 1.

READING, PA.—According to report, the United Power & Transportation Co. will take over the United Traction Co., of Reading, on the basis of $75 of new 4 per cent. collateral trust bonds for each $50 share, with the right to subscribe to 100 shares of the new stock for every 100 shares of the U. T. stock. (April 28, p. 308.)

RUTHERFORD, N. J.—Wm. G. McCormick, Chairman of the Reorganization Committee of the Union Traction Co., of New Jersey, gives notice that certificates must be filed on or before May 12, after which date no subscriptions will be received.

SEATTLE, WASH.—According to report, a number of Seattle capitalists have petitioned the City Council for a 50-year franchise for a company to be formed by the consolidation of all the street railroads in that city. J. D. Lowman and Jacob Furth, President of the Puget Sound National Bank, are reported interested.

SIOUX CITY, IA.—With the consolidation of the surface and elevated railroads in Sioux City, under the name of the Sioux City Traction Co., organized for this purpose, all the old securities will be cancelled and a new issue made of $750,000 5 per cent. 20-year bonds. The S. C. T. will increase its capital stock to $1,200,000 from the incorporation amount, $750,000. (April 7, p. 256; April 14, p. 274.)

SYRACUSE, N. Y.—The Syracuse & East Side St. Ry. was transferred on May 2 to the Syracuse Rapid Transit Co. H. R. Newcomb, of Cleveland, O., acting as trustee for the Cleveland Savings & Trust Co., made the payment of $149,800, which was due May 1. In December $10,000 was paid, and on March 15 $10,000 more was paid, making the whole consideration for the property $169,800. (Feb. 3, p. 96.)

TACOMA, WASH.—The Tacoma Ry. & Power Co., which was incorporated early in February under the laws of New Jersey to take over all the street railroads of Tacoma, is reported to have completed its object and retired all the old securities. The new company is capitalized at $2,000,000 and will issue $1,500,000 of 5 per cent. first mortgage 30-year gold bonds, the Old Colony Trust Co. being trustee. The consolidation brings under one management about 70 miles of double track road. Gordon Abbott is President; I. S. Keeler, of New York, Secretary.

TERRE HAUTE, IND.—The Terre Haute Electric St. Ry. was transferred May 5 to C. L. Webster and C. E. Stone, of Boston, Mass., who will hereafter operate the line. It is said that Mr. Stone and Mr. Webster, who had an option on the first and second mortgage bonds of the company, will buy it in at the coming receiver's sale. They own $450,000 of the first mortgage bonds and about $300,000 of the second mortgage bonds. This road was built by Russell B. Harrison and has been in the hands of a receiver for some time. (April 28, p. 308.)

WASHINGTON, D. C.—Frederick C. Stevens, on May 1 paid to Chas. J. Bell, President of the American Security & Trust Co., as trustee, $800,000, as the second payment of the purchase money for the stock of the Metropolitan RR. and the Columbia Ry.

TRAFFIC.

Traffic Notes.

The Trades League, of Philadelphia, announces that the railroads have agreed to allow 10-day stopovers at that city on through tickets between New York and the West (beyond Pittsburgh) in both directions; also between New York and points south of Washington.

The Lake Shore Limited of the New York Central, leaving New York at 5.30 p. m., now takes passengers only for points west of Buffalo, and the parlor car heretofore run on the train has been taken off.

The Southern Pacific has given notice that second class tickets will not be accepted on the west bound through train leaving Ogden in the afternoon. This will confine the second class travel to one through train daily, and, it is said, will practically compel the adoption of the same restriction as far east as Omaha.

The Interstate Commerce Commission will meet in New York City on May 15 at the United States Court Rooms, to hear evidence in connection with its inquiry into domestic and export rates on grain. While hearings are to be held in other cities, it appears to be the intention of the Commission to make this the principal hearing, as invitations have been sent to all the roads interested to have a representative present at New York.

A strike of grain shovelers at Buffalo is delaying grain. The Grain Shovelers' Union rejected a proposition that the men should receive $1.85 per thousand bushels, which was the scale fixed last year, and that a representative citizen of Buffalo should be appointed to investigate all complaints of the men in future. The men insist that they will not work under a contractor; and they are also holding out for $2 per thousand bushels. A very large grain fleet from Chicago and Duluth is waiting in the harbor to be unloaded, and more vessels are being added daily to this fleet. As the season has opened late, and the boats are in demand, the delay is a hardship on the owners of vessels, as well as on all the other interests involved.

The Southern Passenger Association.

The Cleveland, Cincinnati, Chicago & St. Louis, the St. Louis, Iron Mountain & Southern, the Mobile & Ohio, the Illinois Central, the Louisville & Nashville, the Baltimore & Ohio Southwestern and other interested roads have formed the Southern Passenger Association, to secure maintenance of rates and the regulation of passenger business from and through St. Louis to Southern territory. General Passenger Agent Hanson, of the Illinois Central, is Chairman.

Long and Short Haul in Minnesota.

The Northern Pacific asks the Minnesota Railroad Commissioners to be allowed to reduce freight rates to Duluth via Brainerd to the basis of the Minneapolis-Duluth short line rates, without making corresponding reductions to intermediate points. At the hearing, the counsel of the Northern Pacific said that the interstate commission had frequently granted such a privilege. No harm was done the intermediate points, because their rates remained the same. The Northern Pacific could not afford to give up its local business in order to compete for through business. Counsel for the St. Paul & Duluth replied that if the Northern Pacific were to be allowed to live on its local business to compete with his road, the latter would demand a similar privilege. Mr. Irwin, representing the business men of St. Cloud, declared that the people of St. Cloud would never tolerate freight being hauled through their city from terminal to terminal for less money than they had to pay for a less distance. The commission took the matter under advisement.

Chicago Traffic Matters.

Chicago, April 10, 1899.

A joint committee representing the Trunk and Central Passenger Association lines had a rather stormy meeting in this city over rates to the Grand Army Encampment at Philadelphia. The trouble is over the arbitrary that is to be charged for the "side trip" from Philadelphia to New York. The standard lines insist that this arbitrary ($4 for the round trip) be the same by the standard as by the differential roads. Two or three of the latter, however, insist that the differential principle be applied to this part of the business. The committee will send a divided report to the meeting of the Central Passenger Association. The Trunk Line Association had previously recommended that the differential principle be allowed to prevail for this New York side trip.

Every road running between Chicago and St. Paul and Minneapolis, except the Rock Island, has been fined for secretly cutting labor and other passenger rates. The fines run from $34 to $500. Drafts for the levies have been sent to the offending companies, but it cannot yet be learned whether they will be honored. The "labor" business is now over and rates are being braced up.

Passenger officers of the Western roads have concluded the detail work of reorganizing the Western Passenger Association, and the finishing touch to the new agreement and rules only awaits the final vote on its acceptance, which will be had at a meeting in Chicago, May 17. The trans-Missouri River roads have been represented at all the reorganization meetings, but just why they were is not quite clear, for none of them will go into the reorganized association. The Union Pacific holds what might be called the balance of power. General Passenger Agent Lomax, of that road, says his line cannot be put in such an association for the reason that the Colorado and Utah roads will go into no organization, and he cannot do business with half his line in the Western Passenger Association and the other half in the land of the enemy. The new reorganized association, probably, will be started and the attempt will be made to get along without the trans-Missouri lines.

Officers of the roads running from here into the Wisconsin and Michigan pleasure grounds are figuring on a big business this season. Summer timetables are now being made and additional trains will be put on by each road. Last year's business, which was very large, will, it is believed, be surpassed this season.

Notices have been issued by the Santa Fe that freight shipments for San Francisco will be taken over the San Joaquin Valley road on and after July 1. Just when the new line will be opened for passenger traffic cannot be learned.

Members of the Wisconsin State Board of Control have purchased mileage tickets from the Northwestern, the Chicago, Milwaukee & St. Paul, and the Wisconsin Central roads, for the current year. This is the first official act under the new Wisconsin anti-pass law. The law forbids any public official, whether his office be lucrative or honorary, accepting any free pass or other favor from any corporation. Such acceptance is a felony, punishable by imprisonment in the State prison.

To meet the action of the Great Northern road, the Pullman Company has reduced its sleeping car rates from St. Paul to all points on the Northern Pacific line. The reductions run from 50 cents a berth to $1.50.